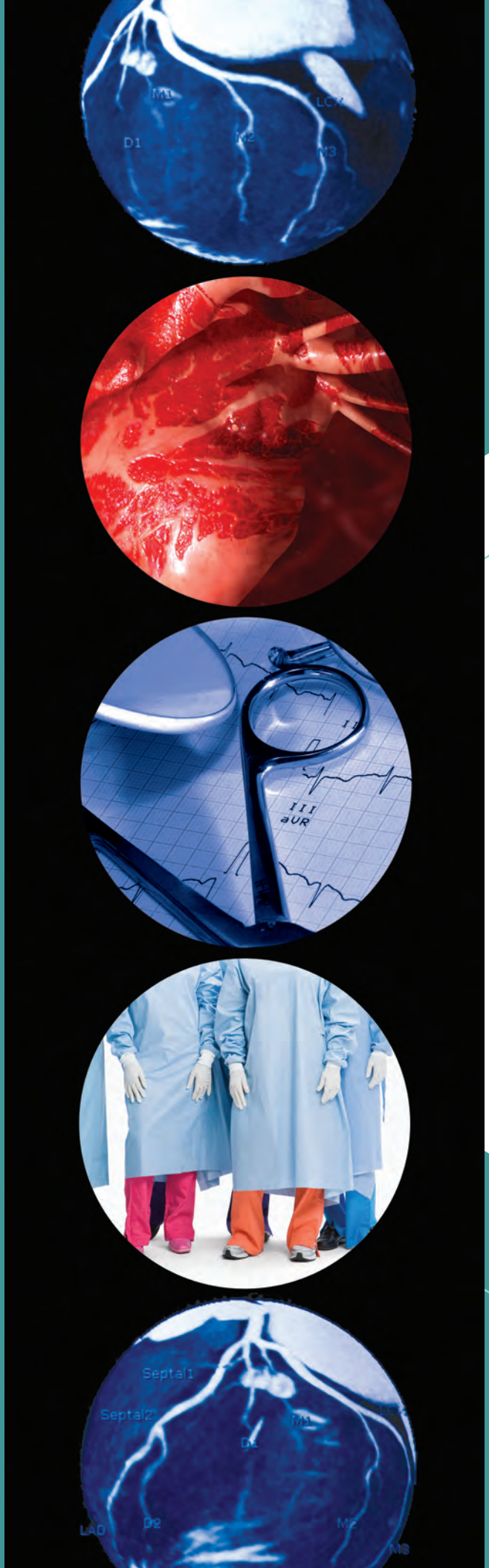

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The California Report on Coronary Artery Bypass Graft Surgery

2007-2008 Hospital and Surgeon Data

California CABG Outcomes Reporting Program

The California Report on

Coronary Artery

Bypass Graft Surgery

2007-2008 Hospital and Surgeon Data

June 2011

Edmund G. Brown Jr., Governor
State of California

Diana S. Dooley, Secretary
Health and Human Services Agency

Stephanie Clendenin, Acting Director
Office of Statewide Health Planning and Development

PREFACE

June 2011

We are pleased to share with you the sixth public release of data from the State's mandatory heart bypass surgery reporting program. This report provides quality ratings for 122 state-licensed hospitals and 279 surgeons that performed isolated coronary artery bypass graft (CABG) surgery during 2007-2008. The risk-adjusted ratings are based on two key outcomes (operative mortality and post-operative stroke) and an important measure of surgical quality (use of the internal mammary artery during CABG surgery).

Isolated CABG surgery means that no other major procedure, such as valve repair or carotid endarterectomy, was performed at the same time as the bypass surgery. In 2008, the statewide operative mortality rate was 2.24%, a continued reduction from the 2.4% rate in 2007 and the 2.9% rate in 2003, the first year of mandatory reporting.

This information is intended for cardiac patients and their families who are developing treatment plans with their doctors. It is also intended for hospitals and surgeons who are 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 are rigorous. However, cardiac surgeon or hospital practices may have changed since the 2007-2008 data were collected by OSHPD.

We commend the hospitals and cardiac surgeons in California and the Clinical Advisory Panel that oversees this program for their hard work and dedication in completing this public report. 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.

Stephanie Clendenin
Acting Director
California Office of Statewide Health Planning and Development

EXECUTIVE SUMMARY

The California Coronary Artery Bypass Graft (CABG) Outcomes Reporting Program is the largest public reporting program on CABG surgery outcomes in the United States.

The *California Report on Coronary Artery Bypass Graft Surgery, 2007-2008 Hospital and Surgeon Data* presents findings from analyses of data collected from 122 California-licensed hospitals where 279 surgeons performed adult isolated CABG[1] during 2007-2008. While surgeon results for risk-adjusted mortality and hospital results for risk-adjusted post-operative stroke are based on combined 2007 and 2008 data, hospital results for risk-adjusted mortality and internal mammary artery utilization are based only on 2008 data for 120 facilities that performed adult isolated CABG surgeries.

The report presents 2008 risk-adjusted operative mortality data and 2007-2008 risk-adjusted post-operative stroke data to help evaluate hospital performance and presents 2007-2008 risk-adjusted operative mortality data to help evaluate surgeon performance. Risk adjustment is a statistical technique that allows for fair comparison of hospital outcomes even though some hospitals have sicker patients than average. Operative mortality includes all deaths that occur during the hospitalization in which the CABG surgery was performed (regardless of length of stay) and any deaths within 30 days after the surgery, no matter where they occur. Post-operative stroke is defined as a central neurologic deficit persisting more than 72 hours (2007 data) or that did not resolve within 24 hours (2008 data) after surgery.[2]

This report also provides hospital-level information on internal mammary artery (IMA)[3] usage for 2008, an additional measure of surgical quality, and examines the relationship between the number of surgeries that hospitals perform and their mortality and post-operative stroke rates.

Key findings from this report are:

2008 Mortality Findings by Hospital:

- There were 313 operative deaths among 13,957 isolated non-salvage CABG surgeries. Patients undergoing CPR on the way to the operating room (salvage cases) were excluded from the report results.

- The operative mortality rate for isolated CABG surgery in California was 2.24%, compared to 2.4% for 2007. The rates for 2006, 2005, 2004, and 2003 were 2.2%,

[1] Isolated CABG surgery refers to heart bypass surgery without other major surgery, such as heart or lung transplantation, valve repair, etc., performed concurrently with the bypass procedure. For a complete definition of isolated CABG, see http://www.oshpd.ca.gov/HID/SubmitData/CCORP_CABG/2006AbstractTrain.pdf.

[2] The Society of Thoracic Surgeons (STS) changed its definition for post-operative stroke from "persisting for more than 72 hours" in the data collection version 2.52 to "unresolved within 24 hours" in version 2.61 in 2008. Details are available at: http://www.sts.org/sections/stsnationaldatabase/datamanagers/generalthoracicdb/datacollection/index.html.

[3] The internal mammary artery (IMA) supplies blood to the front chest wall and the breasts. It is a paired artery, with one running on each side of the inner chest. 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.

3.2%, 3.3%, and 2.9% respectively. This represents a 24% reduction in the operative mortality rate since 2003, the first year of mandated public reporting.

- There was significant variation, from 0% to 11.2%, in hospital operative mortality rates after adjusting for patients' pre-operative health. Despite such variation, 118 of 120 hospitals (98%) performed at a rate that did not differ significantly from the statewide average.
- No hospital performed statistically significantly "Better" than the state average in terms of risk-adjusted operative mortality, but two hospitals performed "Worse" than the state average (shown in the following table alphabetically):

Hospitals with "Worse" Performance Ratings Based on Risk-adjusted Operative Mortality Rates, 2008

Hospital	Region
California Pacific Medical Center - Pacific Campus	San Francisco Bay Area & San Jose
Centinela Hospital Medical Center	Greater Los Angeles

2007-2008 Mortality Findings by Surgeon:

- There were 659 operative deaths among 28,711 isolated (non-salvage) CABG surgeries in 2007-2008.
- The operative mortality rate for isolated CABG surgery in California for 2007-2008 combined was 2.30%, compared to 2.4% for 2005-2006. The rate for 2003-2004 was 3.1%.
- There was significant variation, from 0% to 100%, in surgeon operative mortality rates after adjusting for patients' pre-operative health. Despite such variation, 269 of 279 surgeons (96%) performed at a rate that did not differ significantly from the statewide average.
- Two surgeons performed statistically significantly "Better" than the state average in terms of risk-adjusted operative mortality, while eight surgeons performed "Worse" than the state average (shown in the following table alphabetically):

Surgeons with "Better" Performance Ratings Based on Risk-adjusted Operative Mortality Rates, 2007-2008	
Surgeon	**Region**
Chaugle, Hannan	San Francisco Bay Area & San Jose
Gottner, Robert J.	Greater Los Angeles

Surgeons with "Worse" Performance Ratings Based on Risk-adjusted Operative Mortality Rates, 2007-2008	
Surgeon	**Region**
Gundry, Steven R.	Greater Los Angeles
Howden, Frederick M.	Greater San Diego
Malekmehr, Farshad	San Fernando Valley, Antelope Valley, Ventura & Santa Barbara; Greater Los Angeles
Oka, Tomomi	San Francisco Bay Area & San Jose
Peck, Eric A.	Central California
Perelman, Michael	Greater San Diego
Talieh, Yahya J.	Central California
Yokoyama, Taro	Greater Los Angeles

2007-2008 Stroke Findings by Hospital:

- 411 of the 28,711 patients (1.43%) who underwent isolated CABG surgery experienced a post-operative stroke, similar to the national rate of 1.4% reported by the Society of Thoracic Surgeons.[4]

- There is wide variation in post-operative stroke rates among hospitals after adjusting for patients' pre-operative conditions. Hospital risk-adjusted post-operative stroke rates ranged from 0% to 6.1%, and 115 of 122 hospitals (94%) performed at a rate that did not differ significantly from the statewide average.

[4] Shahian DM, O'Brien SM, Filardo G, et al. The Society of Thoracic Surgeons 2008 cardiac surgery risk models: part 1—coronary artery bypass grafting surgery. Ann Thorac Surg 2009; 88:S2-22.

- One hospital performed "Better" than the state average on post-operative stroke, and six hospitals performed "Worse" than the state average (shown in the following table alphabetically):

Hospitals with "Better" Performance Ratings Based on Risk-adjusted Post-operative Stroke Rates, 2007-2008	
Hospital	**Region**
Alta Bates Summit Medical Center - Summit Campus	San Francisco Bay Area & San Jose

Hospitals with "Worse" Performance Ratings Based on Risk-adjusted Post-operative Stroke Rates, 2007-2008	
Hospital	**Region**
Bakersfield Memorial Hospital	Central California
Dominican Hospital	San Francisco Bay Area & San Jose
Good Samaritan Hospital - San Jose	San Francisco Bay Area & San Jose
Providence Tarzana Medical Center	San Fernando Valley, Antelope Valley, Ventura & Santa Barbara
Scripps Memorial Hospital - La Jolla	Greater San Diego
Tri-City Medical Center	Greater San Diego

2008 Internal Mammary Artery (IMA) Usage Findings by Hospital:

- The IMA is the preferred conduit for CABG surgery of the left anterior descending (LAD) artery. Hospitals with high rates of IMA use are providing high quality of care to their patients. California had a 95.9% IMA usage rate in 2008, compared to 89.6% for 2003. The rates for 2007, 2006, 2005, and 2004 were 93.7%, 93.3%, 92.4%, and 90.1% respectively.[5]

- Five California hospitals had IMA usage rates that were significantly lower than the state average and were given "low" performance ratings. There is no consensus on what an optimum usage rate should be, so performance ratings were not given for very high rates. The lower performing hospitals are listed in the following table alphabetically:

[5] The increase in the statewide IMA usage rate from 93.6% in 2007 to 95.8% in year 2008 is partly due to excluding patients who did not have the left anterior descending (LAD) artery bypassed from the denominator. This was a new exclusion criterion for 2008, and if not used, the statewide IMA usage rate would be 94.4%.

Hospitals with "Low" IMA Usage, 2008	
Hospital	**Region**
Antelope Valley Hospital	San Fernando Valley, Antelope Valley, Ventura & Santa Barbara
Beverly Hospital	Greater Los Angeles
Enloe Medical Center	Sacramento Valley & Northern California Region
St. Helena Hospital	San Francisco Bay Area & San Jose
Sutter Medical Center of Santa Rosa	San Francisco Bay Area & San Jose

Effect of Hospital Volume on CABG Outcomes

- A small, but statistically significant association was found between hospitals' isolated CABG surgery volume and their risk-adjusted operative mortality rates.

- No statistically significant association was found between hospitals' CABG surgery volume (either isolated or total CABG surgery) and their risk-adjusted post-operative stroke rates.

Percutaneous Coronary Intervention vs. CABG Utilization and Outcomes Findings

- In California, utilization of percutaneous coronary interventions (PCIs), such as angioplasty with stent insertion, increased by 14% from 1997 to 2009, peaking in 2005 when total PCI volume reached 60,709. Since then utilization has dropped each year, with 50,704 procedures performed in 2009.

- Between 1997 and 2009, the number of isolated CABG surgeries dropped by 53%, and the observed in-hospital mortality rate for isolated CABG surgeries decreased from 3.1% to 1.7%. However, the observed in-hospital mortality rate for PCIs increased from 1.7% to 1.9%, surpassing in-hospital mortality for isolated CABG surgery in California for the first time.

ACKNOWLEDGMENTS

The California Coronary Artery Bypass Graft (CABG) Outcomes Reporting Program (CCORP) is funded by the Office of Statewide Health Planning and Development's California Health Data and Planning Fund.

Many people contributed to this report. Hospital staff dedicated time and resources to collect, report, and review the data for analysis. Hospitals provided ongoing feedback on the design of the program, which is vital to its success. Members of the CCORP Clinical Advisory Panel provided oversight and policy guidance for data collection and analysis. The Healthcare Information Division and the Healthcare Information Resource Center within the division provided expertise in report concept, editing and design. The California Department of Public Health 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 quality.

CCORP reflects the efforts and significant contributions of the following individuals:

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

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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 in 2007-2008. It is the sixth heart bypass surgery report developed by the California CABG Outcomes Reporting Program (CCORP) of the Office of Statewide Health Planning and Development (OSHPD) in compliance with California Health and Safety Code Sections 128745-128750. This report covers all of California's 122 state-licensed hospitals where 279 surgeons performed this procedure.

Risk-adjusted operative mortality and post-operative stroke are the key outcome measures reported. 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, instead of in-hospital mortality, avoids potential manipulation of outcomes through discharge practices and holds hospitals accountable for patients who died at home or other facilities shortly after discharge. The National Quality Forum (NQF), which serves as the national body for vetting quality measures, has endorsed the national Society of Thoracic Surgeons (STS) operative mortality measure for CABG surgery.[6] STS uses operative mortality as its primary outcome measure for CABG surgery quality reporting, though does not verify deaths following patient discharge, unlike the California CABG Outcomes Reporting Program (CCORP). Post-operative stroke is defined as a central neurologic deficit persisting for more than 72 hours (for surgeries in 2007) or that did not resolve within 24 hours (for surgeries in 2008) after surgery.

In this report, both the operative mortality rate and post-operative stroke rate are adjusted statistically to account for variation in the health condition of patients before CABG surgery.

This report is intended to encourage hospitals and surgeons to examine their surgical practices and make any changes necessary to improve their quality of care. Patients, their families, and healthcare purchasers may use this information when making decisions about CABG surgery.

OSHPD provided all hospitals listed in this report an opportunity to review their results prior to publication and to submit a comment letter for inclusion in this report. Three hospitals submitted letters, and they are included in Appendix A. These statements may help readers understand the concerns of some healthcare providers regarding the information released about them.

OSHPD also provided surgeons an opportunity to review their results and received statements from those who felt their risk-adjusted mortality results did not reflect the quality of care provided. OSHPD staff accepted or rejected the statements and surgeons who did not agree with OSHPD's determination were able to forward their statement to the CCORP Clinical Advisory Panel (CAP)[7] for review. Six surgeons submitted statements to OSHPD regarding their risk-adjusted results, and five were forwarded to the CAP. The CAP concurred with OSHPD's determination on all surgeon statements.

[6] National Quality Forum. National voluntary consensus standards for cardiac surgery, Washington, DC: National Quality Forum, January 2005.

[7] The CCORP Clinical Advisory Panel (CAP) is established in California Health and Safety Code Section 128748. Its members are appointed by the OSHPD Director with nomination from various professional groups.

II. CORONARY ARTERY DISEASE AND BYPASS SURGERY

In 2007-2008, coronary artery disease was the leading cause of adult non-maternal hospital admissions.[8] This represents 191,456 Californians or 6.0% of all adult non-maternal admissions.

Coronary artery disease is a chronic condition 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 accumulate, blood vessels may become partially or completely blocked, preventing the heart from receiving enough oxygen and leading to angina (chest pain) or even myocardial infarction (heart attack).

The two most common procedures for treatment of coronary artery disease are percutaneous coronary intervention (PCI), which includes angioplasty and insertion of stents, and CABG surgery. Despite recent increases in the number of PCIs performed, CABG surgery is more frequently recommended for patients with extensive coronary disease, reduced left ventricular function, and disease involving the left main coronary artery.

During CABG surgery, the surgeon uses arteries or veins from another part of the body (e.g., the internal mammary artery or the saphenous vein from the leg) to serve as conduit for coronary bypass grafts and 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. In most patients, the preferred initial graft for CABG surgery is the internal mammary artery, since it maintains better blood flow over time and is associated with better long-term patient survival.

Study Population

Under State law, California-licensed hospitals are required to report all isolated and non-isolated CABG surgeries to the California CABG Outcomes Reporting Program (CCORP). Isolated CABG surgery is defined as CABG surgery performed without other major procedures, such as valve repair or carotid endarterectomy, during the same surgery. CCORP's detailed definition of isolated CABG surgery can be found at: http://www.oshpd.ca.gov/HID/SubmitData/CCORP_CABG/2006AbstractTrain.pdf.

In 2007-2008, there were 36,929 adult CABG surgeries performed in California. Of these, 28,711 (77.7%) were isolated CABG surgeries and 8,218 (22.3%) 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 2007-2008. Isolated CABG surgery cases were selected as the study population because uniformity of the surgical process allows adequate pre-operative risk adjustment for patient conditions. Non-isolated CABG cases were not used to determine hospital performance ratings in this report.

[8] Data source: OSHPD, Patient Discharge Data, 2007 and 2008. Patients were identified with coronary artery disease 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 2007-2008 clinical data registry collected by CCORP from 122 reporting hospitals. These data are linked to death records from the California Department of Public Health to identify patients who died at home or at facilities other than the operating hospital within 30 days following CABG surgery.

The CCORP clinical registry data 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. The STS and CCORP data definitions are generally identical and CCORP provides additional clarifications to assist hospitals with coding. The data elements collected by CCORP in 2007-2008 and their definitions can be found at the OSHPD Web site:
http://www.oshpd.ca.gov/HID/SubmitData/CCORP_CABG/Format-FileSpecs2.0.pdf
and http://www.oshpd.ca.gov/HID/SubmitData/CCORP_CABG/Format-FileSpecs30.pdf

Data Quality Review and Verification

CCORP reviews the data submitted by each hospital for completeness and errors. Using a three-step data quality review and verification process, CCORP asks hospitals to check data quality, data discrepancies, and potential risk-factor coding problems.

Step 1: Data Quality Reports

Data quality reports compare individual hospital rates for each pre-operative risk factor to the state average and list individual cases for hospital review and correction (e.g., checks for invalid, missing, and abnormally high or low risk factor values).

Step 2: Data Discrepancy Reports

Data discrepancy reports compare the CCORP clinical data to OSHPD's hospital administrative data source, the Patient Discharge Data (PDD). Hospitals are asked to review and account for discrepancies between the two data sources via patient medical chart review to verify that: 1) all CABG surgeries discharged in 2007-2008 were reported; 2) all i*solated* CABG surgery in-hospital deaths were reported; 3*)* coding of *Discharge Status* was consistent; 4) coding of *Cardiogenic Shock* was consistent; 5) coding of *Status of the Procedure* "Emergent/Salvage" was consistent*;* and 6) coding of *Post-Operative Complications* (including strokes) was consistent.

Step 3: Risk-Factor Coding Reports

Risk-factor coding reports compare each hospital's data to prior years of data and to the PDD and medical chart audit findings to identify possible under-reporting and over-reporting of risk factors. CCORP requests hospitals to review and, when necessary, correct poorly coded data elements.

Hospital Medical Chart Audit

After completing the quality review and verification process, CCORP develops a preliminary risk model for operative mortality to help identify candidate hospitals for an on-site medical chart audit. Candidate selection for the 2008 audit was based on results of the preliminary model which identified "Better" or "Worse" hospital performers and on data quality reports which identified problems in over- and under-reporting. A small number of hospitals were also randomly selected for audit.

The 2008 audit included 36 hospitals and a total of 2,520 patient records (30% of all hospitals and 14% of all CABG surgery cases in 2008). On-site medical chart reviews were conducted by trained, independent auditors under contract to OSHPD. All isolated CABG deaths at selected hospitals were audited and high-risk patients were sampled at a higher rate. The number of patient records selected within a hospital was proportional to the isolated CABG volume of the hospital, but generally fell within a range of 40 to 160 cases. If a selected hospital performed less than 40 isolated CABG surgeries per year, all surgeries were audited. An audit summary was sent to each hospital for review and comment and/or correction.

Key findings from the 2008 hospital medical chart audit include:

- Auditors found 15 non-isolated CABG cases that should have been coded as isolated and 33 isolated CABG cases that should have been coded as non-isolated.

- Over-coding (hospital coded risk factor as more severe than auditor) of categorical risk factors for isolated CABG, decreased from 3.9% in 2007 to 3.2% in 2008. Under-coding (hospital coded risk factor as less severe than auditor) of categorical risk factors also decreased from 3.4% to 2.5%.

- In 2008, 5.7% of the comparisons between audited and CCORP data for isolated CABG (categorical data elements) resulted in a data correction. This was a decrease from the 7.4% in 2007.

- Percent agreement is a simple method to determine agreement between hospital abstractors and auditors for more common events.
    - In 2008, percent agreement for 43 audited categorical variables ranged from 68.7% to 100.0%.
    - Forty variables exceeded 80% agreement including 33 variables that exceeded 90% agreement.
    - Percent agreement was low for Mitral Insufficiency (69%), Chronic Lung Disease (77%), and Myocardial Infarction Timing (78%).

- For rare risk factors and outcomes such as *Arrhythmia Type, Cardiogenic Shock, Cerebrovascular Accident Timing, Immunosuppressive Treatment* and all *Complications*, a high percent agreement may simply be due to the absence of the risk factor or outcome in most patients. In these cases, the Kappa statistic is a better measure of agreement and should be used to identify potential coding problems. Kappa values range between 0 (no agreement) and 1 (perfect agreement). For example, the percent agreement for *Immunosuppressive Treatment* was quite high at 97.3%, while the Kappa value was 0.33, showing only fair agreement between hospital abstractors and auditors.

- The percent agreement was below 80% for *Mitral Insufficiency, Chronic Lung Disease, and Myocardial Infarction Timing.* The Kappa values for these elements ranged from 0.36 to 0.69 (fair to good agreement). Of these elements, *Mitral Insufficiency* was more often under-coded than over-coded. This means that hospital coding of *Mitral Insufficiency*, on average, incorrectly characterized patients as being at lower risk, resulting in a less favorable hospital score. *Chronic Lung Disease* and *Myocardial Infarction Timing* were most often over-coded. This means that hospital coding of this element, on average, incorrectly characterized patients as being at higher risk, resulting in a more favorable hospital score.

- Status of procedure was coded correctly for 81.5% of audited isolated CABG surgeries. This variable tended to be over-coded rather than under-coded.

- The percent agreement was 90% or above for all post-operative complications, but as these are relatively rare events, percent agreement is not the best indicator of quality of coding. Kappa values for these outcomes ranged from fair to excellent (0.33-0.86). *Post-operative stroke*, which is now publicly reported at the hospital level, had a strong Kappa value of 0.78.

Individual audit summary reports were sent to audited hospitals for review. The audited data replaced hospital submitted data in generating the final results for this report. All outlier hospitals except one and all outlier surgeons identified for risk-adjusted outcomes in 2007-2008 were audited either in 2008 or in previous years.

IV. RISK MODEL FOR ADJUSTING HOSPITAL AND SURGEON OPERATIVE MORTALITY RATES, 2007-2008

Whether patients recover quickly, have complications, or die following CABG surgery is, in part, a result of the medical care they receive. However, it is difficult to compare outcomes and assess surgical performance because patients treated at different hospitals or by different surgeons often vary in the severity of their pre-operative clinical conditions. This section explains development and validation of CCORP's risk model that accounts for the variation in severity of illness.

To make fair comparisons of care delivered by different healthcare providers, it is necessary to adjust for the differences in severity of illness (case mix) of patients across providers. CCORP "levels the playing field" by considering the pre-operative condition of each patient. Providers that handle more complex cases receive a larger risk-adjustment weight in the risk model, while providers that handle less complex cases receive a smaller weight. Thus, hospitals and surgeons treating sicker patients are not at a disadvantage when their performance is compared with other hospitals or surgeons.

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

To develop the risk model, the 28,711 isolated (non-salvage) CABG surgery cases in 2007-2008 were evaluated for missing data (25,950 cases had no missing data in any field and were used for the risk model parameter estimation). The 2,761 (9.6%) 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. To generate the healthcare hospital and surgeon-specific results shown in this report, missing values for these 2,761 records were imputed (after risk model parameter estimation) by replacing them with the lowest risk category of the same variable (e.g., *Chronic Lung Disease* = *None*). CCORP assigned the lowest risk value based on the following rationales: 1) some hospitals leave data fields blank by design when the risk factor is absent or the value is normal; 2) to maintain consistency with other major cardiac reporting programs that replace missing data 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 cases to estimate each patient's probability of death. CCORP summed these probabilities to estimate the expected mortality for each hospital and surgeon. The risk model, based on the 2007-2008 data, is presented in Table 1 with statistically significant risk factors identified in bolded text.

GUIDE TO INTERPRETING TABLE 1: LOGISTIC REGRESSION RISK MODEL FOR OPERATIVE MORTALITY, 2007-2008	
Coefficient	The coefficient for each explanatory factor represents the effect that a characteristic 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 of the 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, note that the coefficient for "Cardiogenic Shock" is 0.919 and statistically significant. This value is positive, so it indicates that CABG patients with cardiogenic shock are at an increased risk of dying compared to patients who do not have the disease (i.e., cardiogenic shock is a risk factor for operative mortality).
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.
Odds Ratio	An odds ratio is another way of calculating the impact of each characteristic on operative mortality. Mathematically, the odds ratio is the antilogarithm of the coefficient value. The larger the odds ratio, the greater the impact that characteristic has on the risk of dying. An odds ratio close to 1.0 means the effect of the characteristic is close to neutral. For example, the odds ratio for cardiogenic shock is 2.506. This means that for patients with cardiogenic shock, the odds of dying is about 150% higher compared to patients without cardiogenic shock, assuming all other risk factors are the same.

Table 1: Logistic Regression Risk Model for Operative Mortality, 2007-2008

Risk Factor		Coefficient	Standard Error	p-value	Odds Ratio
Intercept		-8.784	0.479	<.0001	
Patient Age (Years)		**0.051**	**0.005**	**<.0001**	**1.052**
Gender	**Female vs. Male**	**0.317**	**0.095**	**0.001**	**1.373**
Race	Non-White vs. White	0.109	0.093	0.242	1.115
Body Mass Index	18.5-39.9	Reference			
	< 18.5	**0.687**	**0.295**	**0.020**	**1.988**
	>=40	**0.663**	**0.194**	**0.001**	**1.940**
Status of the Procedure	1: Elective	Reference			
	2: Urgent	**0.310**	**0.122**	**0.011**	**1.363**
	3: Emergent	**0.941**	**0.210**	**<.0001**	**2.561**
Last Creatinine PreOp (mg/dl)		**0.952**	**0.194**	**<.0001**	**2.590**
Hypertension		-0.098	0.130	0.455	0.907
Peripheral Vascular Disease		**0.213**	**0.107**	**0.048**	**1.237**
Cerebrovascular Disease		**0.269**	**0.107**	**0.012**	**1.308**
Diabetes		-0.030	0.093	0.743	0.970
Chronic Lung Disease	None/Mild	Reference			
	Moderate	**0.461**	**0.152**	**0.003**	**1.586**
	Severe	**0.777**	**0.151**	**<.0001**	**2.176**
Immunosuppressive Treatment		0.055	0.250	0.828	1.056
Dialysis		0.333	0.225	0.138	1.395
Arrhythmia Type	**Afib/Flutter**	**0.455**	**0.127**	**0.0003**	**1.577**
	Heart Block	0.130	0.208	0.532	1.139
	Sust VT/VF	0.395	0.286	0.168	1.484
Timing of Myocardial Infarction	No MI	Reference			
	21+ days ago	0.096	0.135	0.479	1.100
	8-21 days ago	0.162	0.183	0.375	1.176
	1-7 days ago	**0.270**	**0.118**	**0.022**	**1.310**
	<24 Hours	**0.452**	**0.191**	**0.018**	**1.572**
Cardiogenic Shock		**0.919**	**0.193**	**<.0001**	**2.506**
Heart Failure		0.119	0.109	0.278	1.126
NYHA Class IV		**0.275**	**0.110**	**0.013**	**1.316**
Prior Cardiac Surgery	None	Reference			
	One or more	**0.650**	**0.174**	**0.0002**	**1.915**
Interval from Prior PCI to Surgery	No prior PCIs	Reference			
	Prior PCI > 6 HRS	0.141	0.106	0.182	1.152
	Prior PCI <= 6 HRS	0.124	0.287	0.665	1.132
Ejection Fraction (%)		**-0.021**	**0.003**	**<.0001**	**0.979**
Left Main Stenosis (%)		0.004	0.003	0.203	1.004
Number of Diseased Coronary Vessels	None, One, or Two	Reference			
	3 or more	0.110	0.113	0.333	1.116
Mitral Insufficiency	None, Trivial, Mild	Reference			
	Moderate/Severe	0.139	0.143	0.332	1.149
Resuscitation (CPR)		**0.595**	**0.282**	**0.035**	**1.814**
Year	2008 vs. 2007	0.064	0.093	0.491	1.066

Bolded text indicates statistical significance.
Note: Last Creatinine PreOp, Ejection Fraction, and Left Main Stenosis were modeled using piecewise linear transformations.

Discrimination

Risk 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. C-statistics range from 0.5 to 1, with higher values indicating better discrimination. For the 2007-2008 risk model, the C-statistic was 0.799. In recently published CABG surgery mortality reports by other states (New Jersey, New York, and Pennsylvania), the C-statistic ranged from 0.791 to 0.816, which is similar to the 2007-2008 CCORP model.

Calibration

Calibration refers to the ability of a risk model to match predicted mortality with observed mortality. 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 accurate 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 this 2007-2008 risk model is 0.372, indicating adequate 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 deaths with predicted deaths in each of 10 risk groups. The 10 risk groups are created by sorting all observations by the predicted risk of death and then dividing the sorted observations into deciles of approximately equal size. As presented in Table 2, Risk Group 1 shows the patients in the lowest risk group. Among the 2,595 patients in this group, 10 patients died, but the model predicted 8.1 patient deaths. Assuming a Poisson distribution for a binary outcome, the predicted range of deaths for Risk Group 1 is 2.5 to 13.7. The observed number of 10 deaths falls within the range of predicted deaths. In fact, none of ten risk groups has either significantly fewer or significantly more deaths than were predicted by the model. Overall, the risk model shows no systematic underestimation or overestimation of mortality at the extremes.

Table 2: Calibration of Risk Model for Operative Mortality, 2007-2008

Risk Group	Isolated CABG Cases	Observed Deaths	Predicted Deaths	Difference	95% Confidence Interval of Predicted Deaths
1	2,595	10	8.1	-1.9	(2.5, 13.7)
2	2,596	13	12.9	-0.1	(5.9, 20.0)
3	2,595	11	17.2	6.2	(9.1, 25.4)
4	2,595	17	22.2	5.2	(13.0, 31.5)
5	2,596	21	28.2	7.2	(17.8, 38.6)
6	2,596	31	35.7	4.7	(24.0, 47.5)
7	2,595	47	46.8	-0.2	(33.4, 60.2)
8	2,596	73	64.3	-8.7	(48.5, 80.0)
9	2,595	107	97.5	-9.5	(78.2, 116.9)
10	2,591	273	270.0	-3.0	(237.8, 302.2)
Total	**25,950**	**603**	**603.0**	**0**	

V. RISK-ADJUSTED OPERATIVE MORTALITY RESULTS AND HOSPITAL AND SURGEON PERFORMANCE RATINGS

The risk-adjusted mortality rate (RAMR) represents the best estimate of what a healthcare provider's mortality rate would have been if the provider had a patient case mix identical to the statewide average. Thus, this rate is comparable among providers because it accounts for the differences in patient severity-of-illness.

The RAMR is computed, first by dividing the provider's observed mortality by the provider's expected mortality rate (obtained from the risk model calculation) 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 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 (2.24% for 2008; 2.30% for 2007-2008) to obtain the provider's risk-adjusted mortality rate.

However, because a provider's point estimate of the RAMR can be attributed to chance, this report determines the performance rating not based on a point estimate of the RAMR, but based on a comparison of the 95% confidence interval (CI) of each provider's RAMR to the California average mortality rate.[9] CCORP treated 2008 and 2007-2008 data as samples, and inferred a range within which each provider's true performance was likely to fall. As shown in Tables 3 and 4, 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 is **"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 is **"Worse."** If the state average mortality rate is within the 95% CI of a provider's RAMR, the performance rating is "not different" and left blank.

[9] The Poisson Exact Probability method is used for computing the 95% confidence interval for the risk-adjusted mortality rate. (Buchan Iain, *Calculating Poisson Confidence Interval in Excel*, January 2004)

GUIDE TO INTERPRETING TABLES 3 AND 4: HOSPITAL/SURGEON RISK-ADJUSTED OPERATIVE MORTALITY RESULTS	
All CABG Cases	The total number of isolated and non-isolated CABG cases submitted to CCORP for 2008, or 2007 and 2008 combined. Non-isolated CABG 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. All patients in salvage operative status are excluded from the isolated CABG cases, thus only isolated CABG cases without salvage operative status 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 to 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) to the isolated CABG cases multiplied by 100: Expected Mortality Rate = Number of Expected Deaths/Number of Isolated CABG Cases X 100.
Risk-Adjusted Mortality Rate (RAMR) and 95% Confidence Interval (CI)	The Risk-Adjusted Mortality Rate (RAMR) multiplies the observed overall California mortality rate by a provider's 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 Poisson exact 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 provider is classified as "**Better**" if the upper 95% confidence limit of its RAMR falls below the California observed mortality rate. A provider is classified as "**Worse**" if the lower 95% confidence limit of its RAMR is higher than the California observed mortality rate. A provider is classified as "no different" (performance rating is blank) if the California mortality falls within the confidence interval of the provider's risk-adjusted mortality rate.

2008 Hospital Risk-Adjusted Operative Mortality Results

Table 3 presents the risk-adjusted operative mortality results for each hospital for 2008. 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 (excluding salvage patients), the number of observed isolated CABG deaths, observed mortality rate, expected mortality rate predicted by the risk model, RAMR and 95% CI of the RAMR, and the associated hospital performance rating.

Among the 13,957 isolated and non-salvage CABG surgeries performed in 2008, 313 patients died either in-hospital or within 30 days of the surgery date, reflecting an overall operative mortality rate of 2.24%. The *observed* mortality rates among hospitals ranges from 0% to 15.8%. The *expected* mortality rates, which are generated by the risk model and account for patient severity of illness, range between 0.78% and 6.13%. The risk-adjusted mortality rates (RAMR), which measure hospital performance, range from 0% to 11.18%.

Based on the 95% confidence intervals for risk-adjusted mortality rates, 118 of 120 hospitals (98%) 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), no hospital performed significantly **"Better"** than the state average, and two hospitals performed significantly **"Worse"** than the state average. Hospitals marked with two asterisks (**) in Table 3 submitted statements regarding this report (presented in Appendix A).

Table 3: Hospital Risk-Adjusted Operative Mortality Results by Region, 2008

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State of California		**18,040**	**13,957**	**313**	**2.24**				
Sacramento Valley & Northern California Region	Enloe Medical Center	153	134	2	1.49	2.49	1.35	(0.16, 4.86)	
	Mercy General Hospital	866	579	4	0.69	1.75	0.89	(0.24, 2.27)	
	Mercy Medical Center - Redding	178	139	3	2.16	2.20	2.20	(0.45, 6.41)	
	Mercy San Juan Hospital	136	106	1	0.94	2.21	0.96	(0.02, 5.32)	
	Rideout Memorial Hospital	175	146	6	4.11	2.10	4.39	(1.61, 9.54)	
	Shasta Regional Medical Center	56	53	3	5.66	2.35	5.41	(1.11, 15.78)	
	St. Joseph Hospital - Eureka	63	48	0	0.00	4.22	0.00	(0.00, 4.08)	
	Sutter Memorial Hospital	440	314	2	0.64	2.24	0.64	(0.08, 2.30)	
	UC Davis Medical Center	200	132	1	0.76	1.82	0.93	(0.02, 5.18)	
San Francisco Bay Area & San Jose	Alta Bates Summit Medical Center - Summit Campus	637	516	8	1.55	1.87	1.86	(0.80, 3.66)	
	California Pacific Medical Center - Pacific Campus**	92	62	5	8.06	1.81	9.97	(3.23, 23.25)	Worse

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.24%). A hospital is classified as "**Worse**" if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital's RAMR.

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Table 3: Hospital Risk-Adjusted Operative Mortality Results by Region, 2008

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State of California		**18,040**	**13,957**	**313**	**2.24**				
San Francisco Bay Area & San Jose (continued)	Community Hospital Monterey Peninsula	101	74	0	0.00	1.52	0.00	(0.00, 7.36)	
	Dominican Hospital	90	69	5	7.25	3.61	4.51	(1.46, 10.51)	
	El Camino Hospital	82	64	1	1.56	3.08	1.14	(0.03, 6.32)	
	Good Samaritan Hospital - San Jose**	114	86	1	1.16	2.06	1.27	(0.03, 7.04)	
	John Muir Medical Center - Concord Campus	317	252	4	1.59	1.96	1.81	(0.49, 4.63)	
	Kaiser Foundation Hospital (Geary San Francisco)	419	301	2	0.66	1.48	1.00	(0.12, 3.63)	
	Kaiser Foundation Hospital (Santa Clara)	150	101	5	4.95	1.80	6.18	(2.01, 14.41)	
	Marin General Hospital	44	35	1	2.86	1.47	4.35	(0.11, 24.23)	
	O'Connor Hospital	77	62	1	1.61	4.21	0.86	(0.02, 4.79)	
	Peninsula Medical Center	36	27	1	3.70	1.74	4.78	(0.12, 26.62)	
	Queen of the Valley Hospital	151	130	3	2.31	2.98	1.74	(0.36, 5.07)	
	Regional Medical of San Jose	37	30	0	0.00	2.05	0.00	(0.00, 13.41)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.24%). A hospital is classified as "**Worse**" if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital's RAMR.

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State of California		**18,040**	**13,957**	**313**	**2.24**				
San Francisco Bay Area & San Jose (continued)	Salinas Valley Memorial Hospital	138	113	4	3.54	1.94	4.10	(1.12, 10.48)	
	San Ramon Regional Medical Center	46	38	1	2.63	1.34	4.40	(0.11, 24.47)	
	Santa Clara Valley Medical Center	50	44	0	0.00	0.78	0.00	(0.00, 24.16)	
	Santa Rosa Memorial Hospital	76	60	0	0.00	2.25	0.00	(0.00, 6.12)	
	Sequoia Hospital	143	82	1	1.22	2.04	1.34	(0.03, 7.47)	
	Seton Medical Center	203	181	4	2.21	2.47	2.01	(0.55, 5.14)	
	St. Helena Hospital	79	70	2	2.86	4.39	1.46	(0.18, 5.27)	
	St. Mary's Medical Center, San Francisco	27	23	3	13.04	3.00	9.76	(2.01, 28.48)	
	Stanford Hospital	149	93	0	0.00	2.21	0.00	(0.00, 4.02)	
	Sutter Medical Center of Santa Rosa	83	63	1	1.59	1.31	2.72	(0.07, 15.12)	
	UCSF Medical Center	103	74	1	1.35	1.19	2.54	(0.06, 14.16)	
	Valleycare Medical Center	50	36	0	0.00	2.75	0.00	(0.00, 8.35)	
	Washington Hospital - Fremont	114	107	4	3.74	3.07	2.74	(0.74, 6.99)	

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State of California		**18,040**	**13,957**	**313**	**2.24**				
Central California	Bakersfield Heart Hospital	209	175	4	2.29	2.04	2.51	(0.68, 6.42)	
	Bakersfield Memorial Hospital	174	148	5	3.38	1.84	4.12	(1.33, 9.59)	
	Community Regional Medical Center - Fresno	235	193	6	3.11	2.74	2.55	(0.93, 5.54)	
	Dameron Hospital	32	29	0	0.00	2.39	0.00	(0.00, 11.92)	
	Doctors Medical Center	308	242	6	2.48	2.75	2.02	(0.74, 4.39)	
	Fresno Heart and Surgical Hospital	268	229	4	1.75	1.89	2.07	(0.56, 5.29)	
	Kaweah Delta Medical Center	289	220	7	3.18	2.88	2.48	(0.99, 5.10)	
	Marian Medical Center	98	78	3	3.85	2.69	3.21	(0.66, 9.37)	
	Memorial Medical Center Modesto	290	228	7	3.07	2.13	3.23	(1.30, 6.65)	
	San Joaquin Community Hospital	64	53	2	3.77	2.13	3.97	(0.48, 14.31)	
	St. Agnes Medical Center	235	187	4	2.14	2.79	1.72	(0.47, 4.40)	
	St. Joseph's Medical Center of Stockton	286	229	1	0.44	1.70	0.58	(0.01, 3.20)	

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State of California		**18,040**	**13,957**	**313**	**2.24**				
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Antelope Valley Hospital	23	23	3	13.04	2.69	10.86	(2.24, 31.71)	
	CMH of San Buenaventura	117	101	1	0.99	3.46	0.64	(0.02, 3.57)	
	French Hospital Medical Center	120	89	1	1.12	2.17	1.16	(0.03, 6.46)	
	Glendale Adventist Medical Center - Wilson Terrace	120	108	2	1.85	1.93	2.16	(0.26, 7.78)	
	Glendale Memorial Hospital and Health Center	232	157	4	2.55	2.23	2.57	(0.70, 6.56)	
	Lancaster Community Hospital	6	6	0	0.00	1.57	0.00	(0.00, 87.61)	
	Los Robles Hospital and Medical Center	91	63	0	0.00	2.54	0.00	(0.00, 5.16)	
	Northridge Hospital Medical Center	106	93	3	3.23	2.28	3.18	(0.65, 9.28)	
	Providence Holy Cross Medical Center	82	57	2	3.51	3.22	2.45	(0.30, 8.82)	
	Providence St. Joseph Medical Center	79	59	0	0.00	2.02	0.00	(0.00, 6.94)	
	Providence Tarzana Medical Center	90	75	3	4.00	2.50	3.58	(0.74, 10.46)	
	Santa Barbara Cottage Hospital	156	125	3	2.40	2.47	2.18	(0.45, 6.36)	

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State of California		**18,040**	**13,957**	**313**	**2.24**				
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara (continued)	Sierra Vista Regional Medical Center	20	19	3	15.79	3.77	9.39	(1.93, 27.41)	
	St. John's Regional Medical Center	116	89	3	3.37	2.94	2.57	(0.53, 7.51)	
	Valley Presbyterian Hospital	37	35	2	5.71	2.36	5.44	(0.66, 19.62)	
	West Hills Hospital and Medical Center	54	47	1	2.13	1.76	2.70	(0.07, 15.05)	
Greater Los Angeles	Beverly Hospital	10	8	1	12.50	2.51	11.18	(0.28, 62.23)	
	Cedars Sinai Medical Center	233	134	3	2.24	1.85	2.71	(0.56, 7.91)	
	Centinela Hospital Medical Center	53	49	7	14.29	2.95	10.85	(4.36, 22.34)	Worse
	Citrus Valley Medical Center – IC Campus	77	60	2	3.33	2.35	3.18	(0.38, 11.47)	
	Downey Regional Medical Center	66	56	1	1.79	1.60	2.51	(0.06, 13.95)	
	Garfield Medical Center	132	120	2	1.67	2.21	1.69	(0.20, 6.11)	
	Good Samaritan Hospital - Los Angeles	142	116	3	2.59	2.85	2.04	(0.42, 5.95)	
	Huntington Memorial Hospital	78	55	1	1.82	1.95	2.10	(0.05, 11.66)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.24%). A hospital is classified as "**Worse**" if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital's RAMR.

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State of California		**18,040**	**13,957**	**313**	**2.24**				
Greater Los Angeles (continued)	Kaiser Foundation Hospital (Sunset)	661	499	12	2.40	2.22	2.43	(1.25, 4.24)	
	Lakewood Regional Medical Center	96	84	2	2.38	2.48	2.16	(0.26, 7.78)	
	Little Company of Mary Hospital	78	53	1	1.89	2.92	1.45	(0.04, 8.05)	
	Long Beach Memorial Medical Center	266	226	6	2.65	1.69	3.51	(1.29, 7.64)	
	Los Angeles County/Harbor - UCLA Medical Center	86	79	1	1.27	1.81	1.57	(0.04, 8.75)	
	Los Angeles County/USC Medical Center	99	85	1	1.18	0.90	2.93	(0.07, 16.28)	
	Methodist Hospital of Southern California	68	58	1	1.72	2.02	1.91	(0.05, 10.65)	
	Presbyterian Intercommunity Hospital	113	73	0	0.00	1.97	0.00	(0.00, 5.75)	
	Ronald Reagan UCLA Medical Center	196	112	3	2.68	2.67	2.25	(0.46, 6.57)	
	Santa Monica - UCLA Medical Center and Orthopedic Hospital	24	21	2	9.52	3.07	6.97	(0.84, 25.14)	
	St. Francis Medical Center	40	37	1	2.70	1.67	3.64	(0.09, 20.24)	
	St. John's Health Center	89	62	2	3.23	1.62	4.47	(0.54, 16.12)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.24%). A hospital is classified as "**Worse**" if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital's RAMR.

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Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State of California		**18,040**	**13,957**	**313**	**2.24**				
Greater Los Angeles (continued)	St. Mary Medical Center	53	46	2	4.35	6.13	1.59	(0.19, 5.74)	
	St. Vincent Medical Center	131	112	4	3.57	2.49	3.21	(0.87, 8.21)	
	Torrance Memorial Medical Center	103	62	1	1.61	2.55	1.42	(0.04, 7.91)	
	USC University Hospital	165	83	2	2.41	2.09	2.59	(0.31, 9.33)	
	White Memorial Medical Center	61	56	0	0.00	1.85	0.00	(0.00, 7.99)	
Inland Empire, Riverside & San Bernardino	Desert Regional Medical Center**	199	155	6	3.87	2.15	4.04	(1.48, 8.79)	
	Eisenhower Medical Center	268	207	7	3.38	2.69	2.82	(1.13, 5.79)	
	Loma Linda University Medical Center	324	250	4	1.60	2.19	1.64	(0.45, 4.19)	
	Pomona Valley Hospital Medical Center	176	149	2	1.34	2.92	1.03	(0.12, 3.72)	
	Riverside Community Hospital	256	218	5	2.29	1.93	2.67	(0.87, 6.23)	
	San Antonio Community Hospital	143	104	2	1.92	2.41	1.79	(0.22, 6.47)	
	St. Bernardine Medical Center	589	511	11	2.15	2.07	2.33	(1.16, 4.16)	
	St. Mary Regional Medical Center	212	186	4	2.15	3.12	1.55	(0.42, 3.95)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.24%). A hospital is classified as "**Worse**" if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital's RAMR.

** Hospitals marked with two asterisks (**) in Table 3 submitted statements regarding this report. See Appendix A for their statements.

Table 3: Hospital Risk-Adjusted Operative Mortality Results by Region, 2008

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State of California		**18,040**	**13,957**	**313**	**2.24**				
Orange County	Anaheim Memorial Medical Center	167	141	3	2.13	2.32	2.06	(0.42, 6.00)	
	Fountain Valley Regional Hospital and Medical Center	129	124	3	2.42	2.42	2.24	(0.46, 6.53)	
	Hoag Memorial Hospital Presbyterian	237	145	1	0.69	1.74	0.89	(0.02, 4.94)	
	Irvine Regional Hospital and Medical Center	40	32	0	0.00	2.30	0.00	(0.00, 11.21)	
	Mission Hospital Regional Medical Center	124	98	3	3.06	1.60	4.29	(0.88, 12.53)	
	Saddleback Memorial Medical Center	116	100	1	1.00	2.33	0.96	(0.02, 5.37)	
	St. Joseph Hospital - Orange	129	104	1	0.96	1.98	1.09	(0.03, 6.07)	
	St. Jude Medical Center	104	87	3	3.45	1.45	5.33	(1.10, 15.56)	
	UC Irvine Medical Center	60	42	3	7.14	1.63	9.80	(2.02, 28.62)	
	West Anaheim Medical Center	17	17	0	0.00	1.77	0.00	(0.00, 27.40)	
	Western Medical Center - Santa Ana	40	36	2	5.56	1.43	8.72	(1.06, 31.47)	
	Western Medical Center Hospital - Anaheim	108	96	0	0.00	1.83	0.00	(0.00, 4.71)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.24%). A hospital is classified as "**Worse**" if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital's RAMR.

** Hospitals marked with two asterisks (**) in Table 3 submitted statements regarding this report. See Appendix A for their statements.

Table 3: Hospital Risk-Adjusted Operative Mortality Results by Region, 2008

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State of California		**18,040**	**13,957**	**313**	**2.24**				
Greater San Diego	Alvarado Hospital	84	69	5	7.25	2.54	6.41	(2.08, 14.94)	
	Palomar Medical Center	87	62	2	3.23	1.79	4.04	(0.49, 14.59)	
	Scripps Green Hospital	126	84	0	0.00	1.76	0.00	(0.00, 5.58)	
	Scripps Memorial Hospital - La Jolla	375	254	6	2.36	2.42	2.19	(0.80, 4.76)	
	Scripps Mercy Hospital	142	110	3	2.73	1.93	3.17	(0.65, 9.24)	
	Sharp Chula Vista Medical Center	180	138	4	2.90	2.91	2.24	(0.61, 5.72)	
	Sharp Grossmont Hospital	199	149	5	3.36	2.82	2.67	(0.87, 6.23)	
	Sharp Memorial Hospital	204	132	2	1.52	1.64	2.08	(0.25, 7.49)	
	Tri-City Medical Center	117	90	1	1.11	1.58	1.58	(0.04, 8.78)	
	UCSD Medical Center	42	34	1	2.94	3.59	1.84	(0.05, 10.23)	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	114	86	2	2.33	1.83	2.85	(0.35, 10.30)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.24%). A hospital is classified as "**Worse**" if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital's RAMR.

** Hospitals marked with two asterisks (**) in Table 3 submitted statements regarding this report. See Appendix A for their statements.

2007-2008 Surgeon Risk-Adjusted Operative Mortality Results

Table 4 presents the risk-adjusted results for each responsible surgeon for 2007-2008, both for the surgeon overall (i.e., across all hospitals in which the surgeon operated) and by each hospital where the surgeon performed CABG surgery. Included are the total number of CABG surgeries performed (isolated and non-isolated (non-salvage) 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 (RAMR), the 95% CI of the RAMR, and the associated surgeon performance rating.

Among the 28,711 isolated and non-salvage CABG surgeries performed in 2007 and 2008, 659 patients died in-hospital or within 30 days of the surgery date, reflecting an overall operative mortality rate of 2.30% in California. Observed operative mortality rates for surgeons ranged from 0% to 100%. The surgeon expected mortality rate, which accounts for patient severity of illness, ranged from 0.34% to 14.5%. The surgeon risk-adjusted mortality rate (RAMR), which measures surgeon performance, ranged from 0% to 100%.

For overall surgeon performance, 269 of 279 surgeons (96%) performed within the expected range (performance rating is left blank). Two surgeons performed significantly **"Better"** than the state average and eight surgeons performed **"Worse"** than the state average.

Many surgeons perform surgery at multiple hospital sites. For surgeon-by-hospital results, 97% performed within the expected range (performance rating is blank), one surgeon at a hospital performed significantly **"Better"** than the state average, and 11 surgeons at a hospital performed **"Worse"** than the state average. Surgeons who performed only non-isolated CABG surgeries are included in Table 4, but no rates have been calculated and the performance rating is noted as **"Not Applicable."**

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Abolhoda, Amir M.	Surgeon Overall	55	45	2	4.44	1.31	7.81	(0.95, 28.24)	
	UC Irvine Medical Center	55	45	2	4.44	1.31	7.81	(0.95, 28.24)	
Abraham, Reginald G.	Surgeon Overall	61	58	3	5.17	1.60	7.43	(1.53, 21.73)	
	Fountain Valley Regional Hospital and Medical Center	59	56	2	3.57	1.49	5.51	(0.67, 19.92)	
	Rideout Memorial Hospital	2	2	1	50.00	4.68	24.55	(0.62, 100.0)	
Adams, Carl W.	Surgeon Overall	5	4	0	0.00	2.16	0.00	(0.00, 98.34)	
	St. Joseph Hospital - Eureka	5	4	0	0.00	2.16	0.00	(0.00, 98.34)	
Adamson, Robert M.	Surgeon Overall	115	74	0	0.00	1.31	0.00	(0.00, 8.72)	
	Sharp Memorial Hospital	115	74	0	0.00	1.31	0.00	(0.00, 8.72)	
Afifi, Alaa Y.	Surgeon Overall	85	77	1	1.30	1.29	2.32	(0.06, 12.94)	
	Anaheim Memorial Medical Center	10	8	0	0.00	0.71	0.00	(0.00, 100.0)	
	Fountain Valley Regional Hospital and Medical Center	25	24	0	0.00	1.70	0.00	(0.00, 20.77)	
	West Anaheim Medical Center	3	3	0	0.00	0.82	0.00	(0.00, 100.0)	
	Western Medical Center - Santa Ana	11	8	1	12.50	1.07	26.97	(0.68, 100.0)	
	Western Medical Center Hospital - Anaheim	36	34	0	0.00	1.22	0.00	(0.00, 20.42)	
Alyono, David	Surgeon Overall	183	138	2	1.45	2.01	1.66	(0.20, 5.99)	
	Alta Bates Summit Medical Center - Summit Campus	183	138	2	1.45	2.01	1.66	(0.20, 5.99)	
Amirhamzeh, Mehrdad M.	Surgeon Overall	43	40	3	7.50	2.19	7.88	(1.63, 23.03)	
	Memorial Medical Center Modesto	43	40	3	7.50	2.19	7.88	(1.63, 23.03)	
Anastassiou, Peter T.	Surgeon Overall	16	14	2	14.29	2.65	12.40	(1.50, 44.81)	
	California Pacific Medical Center - Pacific Campus	4	3	0	0.00	4.07	0.00	(0.00, 69.54)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Anastassiou, Peter T.	Marin General Hospital	1	1	0	0.00	0.26	0.00	(0.00, 100.0)	
	Peninsula Medical Center	1	1	0	0.00	2.64	0.00	(0.00, 100.0)	
	Seton Medical Center	7	7	2	28.57	2.94	22.30	(2.70, 80.61)	Worse
	Sutter Medical Center of Santa Rosa	3	2	0	0.00	0.68	0.00	(0.00, 100.0)	
Arcidi, Joseph M.	Surgeon Overall	7	4	0	0.00	10.98	0.00	(0.00, 19.32)	
	Good Samaritan Hospital - Los Angeles	7	4	0	0.00	10.98	0.00	(0.00, 19.32)	
Ardehali, Abbas	Surgeon Overall	73	47	4	8.51	3.28	5.97	(1.63, 15.29)	
	Ronald Reagan UCLA Medical Center	55	32	3	9.38	3.49	6.18	(1.28, 18.07)	
	Santa Monica - UCLA Medical Center and Orthopedic Hospital	18	15	1	6.67	2.83	5.41	(0.14, 30.17)	
Atiya, Azmi W.	Surgeon Overall	159	126	4	3.17	2.54	2.87	(0.78, 7.36)	
	Northridge Hospital Medical Center	92	76	1	1.32	2.12	1.43	(0.04, 7.96)	
	Providence Holy Cross Medical Center	48	32	2	6.25	3.47	4.13	(0.50, 14.94)	
	Providence Tarzana Medical Center	7	6	0	0.00	4.52	0.00	(0.00, 31.27)	
	West Hills Hospital and Medical Center	12	12	1	8.33	1.72	11.14	(0.28, 62.11)	
Bailey, Leonard L.	Surgeon Overall	1	1	0	0.00	14.50	0.00	(0.00, 58.53)	
	Loma Linda University Medical Center	1	1	0	0.00	14.50	0.00	(0.00, 58.53)	
Baker, Craig J.	Surgeon Overall	97	76	1	1.32	1.82	1.66	(0.04, 9.27)	
	Huntington Memorial Hospital	10	8	0	0.00	1.75	0.00	(0.00, 60.61)	
	Los Angeles County/USC Medical Center	30	28	0	0.00	0.96	0.00	(0.00, 31.62)	
	USC University Hospital	57	40	1	2.50	2.44	2.36	(0.06, 13.15)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Baladi, Naoum	Surgeon Overall	158	128	4	3.13	3.00	2.40	(0.65, 6.14)	
	Seton Medical Center	148	119	3	2.52	2.97	1.95	(0.40, 5.71)	
	St. Mary's Medical Center, San Francisco	10	9	1	11.11	3.39	7.54	(0.19, 42.04)	
Baradarian, Sam	Surgeon Overall	99	78	0	0.00	1.93	0.00	(0.00, 5.63)	
	Sharp Memorial Hospital	99	78	0	0.00	1.93	0.00	(0.00, 5.63)	
Baumgartner, Fritz J.	Surgeon Overall	10	10	0	0.00	3.02	0.00	(0.00, 28.11)	
	Mercy Medical Center - Redding	10	10	0	0.00	3.02	0.00	(0.00, 28.11)	
Berjis, Amir	Surgeon Overall	1	1	0	0.00	0.34	0.00	(0.00, 100.0)	
	San Joaquin Community Hospital	1	1	0	0.00	0.34	0.00	(0.00, 100.0)	
Bethencourt, Daniel M.	Surgeon Overall	215	164	2	1.22	1.59	1.76	(0.21, 6.36)	
	Lakewood Regional Medical Center	7	3	1	33.33	1.12	68.34	(1.73, 100.0)	
	Little Company of Mary Hospital	3	1	0	0.00	1.57	0.00	(0.00, 100.0)	
	Long Beach Memorial Medical Center	205	160	1	0.63	1.60	0.90	(0.02, 5.00)	
Beygui, Ramin E.	Surgeon Overall	98	73	2	2.74	2.94	2.14	(0.26, 7.75)	
	California Pacific Medical Center - Pacific Campus	1	0	.	.	.	.		Not Applicable
	El Camino Hospital	89	67	2	2.99	2.93	2.34	(0.28, 8.46)	
	Ronald Reagan UCLA Medical Center	8	6	0	0.00	3.01	0.00	(0.00, 47.01)	
Birnbaum, Peter L.	Surgeon Overall	188	140	6	4.29	2.65	3.72	(1.37, 8.11)	
	Community Regional Medical Center - Fresno	30	24	2	8.33	3.66	5.24	(0.63, 18.93)	
	Dominican Hospital	1	0	.	.	.	.		Not Applicable

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Birnbaum, Peter L.	Fresno Heart and Surgical Hospital	84	64	2	3.13	1.82	3.94	(0.48, 14.23)	
	St. Agnes Medical Center	73	52	2	3.85	3.19	2.77	(0.34, 10.01)	
Biswas, Shankha S.	Surgeon Overall	124	109	1	0.92	1.50	1.40	(0.04, 7.82)	
	Riverside Community Hospital	124	109	1	0.92	1.50	1.40	(0.04, 7.82)	
Blanche, Carlos E.	Surgeon Overall	82	67	3	4.48	1.53	6.73	(1.39, 19.68)	
	St. Jude Medical Center	82	67	3	4.48	1.53	6.73	(1.39, 19.68)	
Bogerty, Sharon	Surgeon Overall	4	4	0	0.00	3.20	0.00	(0.00, 66.37)	
	O'Connor Hospital	4	4	0	0.00	3.20	0.00	(0.00, 66.37)	
Bolton, J. W. Randolph	Surgeon Overall	94	85	3	3.53	2.36	3.44	(0.71, 10.05)	
	St. Agnes Medical Center	94	85	3	3.53	2.36	3.44	(0.71, 10.05)	
Brandenhoff, Preben	Surgeon Overall	2	1	0	0.00	0.56	0.00	(0.00, 100.0)	
	California Pacific Medical Center - Pacific Campus	2	1	0	0.00	0.56	0.00	(0.00, 100.0)	
Brewster, Scot A.	Surgeon Overall	231	142	4	2.82	2.10	3.08	(0.84, 7.88)	
	Scripps Memorial Hospital - La Jolla	231	142	4	2.82	2.10	3.08	(0.84, 7.88)	
Buehler, Donald L.	Surgeon Overall	193	127	1	0.79	2.27	0.80	(0.02, 4.44)	
	Scripps Memorial Hospital - La Jolla	193	127	1	0.79	2.27	0.80	(0.02, 4.44)	
Bushnell, Lamar J.	Surgeon Overall	109	94	1	1.06	4.70	0.52	(0.01, 2.90)	
	CMH of San Buenaventura	109	94	1	1.06	4.70	0.52	(0.01, 2.90)	
Cahill, Anne T.	Surgeon Overall	84	71	2	2.82	2.62	2.47	(0.30, 8.92)	
	Shasta Regional Medical Center	84	71	2	2.82	2.62	2.47	(0.30, 8.92)	
Cain, Brian S.	Surgeon Overall	342	274	2	0.73	1.79	0.94	(0.11, 3.39)	
	Alta Bates Summit Medical Center - Summit Campus	342	274	2	0.73	1.79	0.94	(0.11, 3.39)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Calhoun, Royce F.	Surgeon Overall	29	23	0	0.00	2.09	0.00	(0.00, 17.67)	
	UC Davis Medical Center	29	23	0	0.00	2.09	0.00	(0.00, 17.67)	
Caminha, Sergio D.	Surgeon Overall	204	161	2	1.24	2.97	0.96	(0.12, 3.47)	
	Kaweah Delta Medical Center	204	161	2	1.24	2.97	0.96	(0.12, 3.47)	
Canvasser, David A.	Surgeon Overall	193	153	8	5.23	2.88	4.18	(1.80, 8.23)	
	French Hospital Medical Center	89	70	3	4.29	2.76	3.56	(0.74, 10.42)	
	Marian Medical Center	87	67	2	2.99	2.87	2.39	(0.29, 8.64)	
	Sierra Vista Regional Medical Center	17	16	3	18.75	3.41	12.66	(2.61, 37.01)	Worse
Capouya, Eli R.	Surgeon Overall	226	183	5	2.73	2.18	2.88	(0.94, 6.72)	
	Glendale Adventist Medical Center - Wilson Terrace	109	88	2	2.27	2.21	2.36	(0.29, 8.53)	
	Good Samaritan Hospital - Los Angeles	46	42	1	2.38	2.20	2.49	(0.06, 13.87)	
	Huntington Memorial Hospital	2	1	0	0.00	2.03	0.00	(0.00, 100.0)	
	Methodist Hospital of Southern California	17	14	2	14.29	1.81	18.09	(2.19, 65.40)	
	Providence St. Joseph Medical Center	36	26	0	0.00	2.44	0.00	(0.00, 13.40)	
	St. Vincent Medical Center	16	12	0	0.00	1.79	0.00	(0.00, 39.56)	
Caravella, Peter A.	Surgeon Overall	5	5	0	0.00	1.92	0.00	(0.00, 88.43)	
	Queen of the Valley Hospital	3	3	0	0.00	0.65	0.00	(0.00, 100.0)	
	Santa Rosa Memorial Hospital	3	3	0	0.00	2.69	0.00	(0.00, 100.0)	
Castro, Luis J.	Surgeon Overall	298	174	4	2.30	2.38	2.22	(0.60, 5.68)	
	California Pacific Medical Center - Pacific Campus	61	43	3	6.98	1.61	9.95	(2.05, 29.08)	
	Community Hospital Monterey Peninsula	2	1	0	0.00	0.82	0.00	(0.00, 100.0)	
	Peninsula Medical Center	23	16	1	6.25	1.55	9.28	(0.24, 51.76)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Castro, Luis J.	Sequoia Hospital	212	114	0	0.00	2.80	0.00	(0.00, 2.65)	
Chammas, Joseph H.	Surgeon Overall	100	77	3	3.90	1.86	4.82	(0.99, 14.09)	
	Sharp Memorial Hospital	100	77	3	3.90	1.86	4.82	(0.99, 14.09)	
Chaudhry, Pervaiz A.	Surgeon Overall	366	320	6	1.88	2.59	1.67	(0.61, 3.63)	
	Community Regional Medical Center - Fresno	159	144	4	2.78	2.32	2.75	(0.75, 7.05)	
	Dominican Hospital	10	7	0	0.00	2.65	0.00	(0.00, 45.82)	
	Fresno Heart and Surgical Hospital	108	94	0	0.00	2.45	0.00	(0.00, 3.68)	
	St. Agnes Medical Center	89	75	2	2.67	3.26	1.88	(0.23, 6.79)	
Chaugle, Hannan	Surgeon Overall	294	250	1	0.40	2.24	0.41	(0.01, 2.29)	Better
	Doctors Medical Center	198	171	0	0.00	2.43	0.00	(0.00, 2.04)	Better
	Memorial Medical Center Modesto	96	79	1	1.27	1.83	1.59	(0.04, 8.88)	
Chen, Raymond H.	Surgeon Overall	390	385	13	3.38	2.17	3.57	(1.90, 6.11)	
	Kaiser Foundation Hospital (Sunset)	387	382	13	3.40	2.18	3.59	(1.91, 6.13)	
	St. Bernardine Medical Center	3	3	0	0.00	1.30	0.00	(0.00, 100.0)	
Cheng, Wen	Surgeon Overall	17	11	0	0.00	2.09	0.00	(0.00, 36.97)	
	Cedars Sinai Medical Center	17	11	0	0.00	2.09	0.00	(0.00, 36.97)	
Cohen, Robbin G.	Surgeon Overall	151	116	1	0.86	2.09	0.95	(0.02, 5.28)	
	Huntington Memorial Hospital	125	100	0	0.00	2.12	0.00	(0.00, 4.01)	
	Los Angeles County/USC Medical Center	1	1	0	0.00	1.57	0.00	(0.00, 100.0)	
	USC University Hospital	24	14	1	7.14	2.07	7.95	(0.20, 44.31)	
	White Memorial Medical Center	1	1	0	0.00	0.41	0.00	(0.00, 100.0)	
Coletta, Joelle M.	Surgeon Overall	18	16	0	0.00	1.69	0.00	(0.00, 31.29)	
	Scripps Green Hospital	11	10	0	0.00	1.20	0.00	(0.00, 70.54)	
	Scripps Mercy Hospital	7	6	0	0.00	2.51	0.00	(0.00, 56.23)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Concepcion, Noel L.	Surgeon Overall	314	250	5	2.00	2.30	2.00	(0.65, 4.66)	
	Doctors Medical Center	297	234	5	2.14	2.33	2.11	(0.68, 4.92)	
	Memorial Medical Center Modesto	17	16	0	0.00	1.93	0.00	(0.00, 27.52)	
Connor, Ann R.	Surgeon Overall	26	23	3	13.04	4.89	6.13	(1.26, 17.91)	
	Good Samaritan Hospital - Los Angeles	22	19	2	10.53	4.47	5.41	(0.66, 19.57)	
	Long Beach Memorial Medical Center	1	1	0	0.00	0.70	0.00	(0.00, 100.0)	
	St. Vincent Medical Center	3	3	1	33.33	8.99	8.53	(0.22, 47.53)	
Cunningham, Mark J.	Surgeon Overall	106	58	1	1.72	3.00	1.32	(0.03, 7.37)	
	Huntington Memorial Hospital	8	6	0	0.00	2.94	0.00	(0.00, 48.12)	
	Los Angeles County/USC Medical Center	9	7	0	0.00	1.04	0.00	(0.00, 100.0)	
	USC University Hospital	81	39	1	2.56	3.54	1.67	(0.04, 9.29)	
	White Memorial Medical Center	8	6	0	0.00	1.85	0.00	(0.00, 76.27)	
Dandekar, Nandkumar V.	Surgeon Overall	1	1	0	0.00	2.55	0.00	(0.00, 100.0)	
	Citrus Valley Medical Center – IC Campus	1	1	0	0.00	2.55	0.00	(0.00, 100.0)	
Danielson, Daren S.	Surgeon Overall	15	14	0	0.00	1.39	0.00	(0.00, 43.68)	
	UC Davis Medical Center	15	14	0	0.00	1.39	0.00	(0.00, 43.68)	
Darbinian, Sevak H.	Surgeon Overall	175	128	2	1.56	1.72	2.09	(0.25, 7.56)	
	Mission Hospital Regional Medical Center	167	123	2	1.63	1.74	2.15	(0.26, 7.76)	
	Saddleback Memorial Medical Center	8	5	0	0.00	1.14	0.00	(0.00, 100.0)	
Davtyan, Hakob G.	Surgeon Overall	326	271	7	2.58	3.03	1.96	(0.79, 4.04)	
	Riverside Community Hospital	81	71	1	1.41	1.99	1.62	(0.04, 9.05)	
	St. Bernardine Medical Center	163	129	6	4.65	3.50	3.05	(1.12, 6.65)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Davtyan, Hakob G.	St. Mary Regional Medical Center	82	71	0	0.00	3.21	0.00	(0.00, 3.72)	
Declusin, Richard J.	Surgeon Overall	175	130	2	1.54	2.40	1.47	(0.18, 5.32)	
	Los Robles Hospital and Medical Center	47	32	0	0.00	3.14	0.00	(0.00, 8.44)	
	St. John's Regional Medical Center	128	98	2	2.04	2.16	2.17	(0.26, 7.85)	
Deeik, Ramzi K.	Surgeon Overall	208	162	2	1.23	2.46	1.15	(0.14, 4.17)	
	Queen of the Valley Hospital	105	84	1	1.19	2.51	1.09	(0.03, 6.07)	
	Santa Rosa Memorial Hospital	102	77	1	1.30	2.43	1.23	(0.03, 6.85)	
Defilippi, Vincent J.	Surgeon Overall	14	9	1	11.11	1.87	13.67	(0.35, 76.21)	
	Salinas Valley Memorial Hospital	14	9	1	11.11	1.87	13.67	(0.35, 76.21)	
Dein, John R	Surgeon Overall	413	290	1	0.34	1.66	0.48	(0.01, 2.67)	
	Mercy General Hospital	398	281	1	0.36	1.67	0.49	(0.01, 2.72)	
	Mercy San Juan Hospital	15	9	0	0.00	1.10	0.00	(0.00, 85.34)	
Del Campo, Carlos	Surgeon Overall	91	83	1	1.20	1.57	1.77	(0.04, 9.84)	
	St. Jude Medical Center	83	77	1	1.30	1.59	1.88	(0.05, 10.47)	
	Western Medical Center Hospital - Anaheim	8	6	0	0.00	1.30	0.00	(0.00, 100.0)	
Del Rio, Michael J.	Surgeon Overall	176	138	3	2.17	2.82	1.77	(0.37, 5.19)	
	Riverside Community Hospital	175	137	3	2.19	2.79	1.80	(0.37, 5.27)	
	St. Bernardine Medical Center	1	1	0	0.00	5.89	0.00	(0.00, 100.0)	
Dembitsky, Walter P.	Surgeon Overall	131	55	1	1.82	1.51	2.77	(0.07, 15.42)	
	Sharp Memorial Hospital	131	55	1	1.82	1.51	2.77	(0.07, 15.42)	
Derenoncourt, Frantz J.	Surgeon Overall	50	46	1	2.17	3.91	1.28	(0.03, 7.13)	
	Alvarado Hospital	25	23	0	0.00	2.34	0.00	(0.00, 15.78)	
	Scripps Mercy Hospital	1	1	0	0.00	0.79	0.00	(0.00, 100.0)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Derenoncourt, Frantz J.	Sharp Chula Vista Medical Center	24	22	1	4.55	5.69	1.84	(0.05, 10.23)	
Derrick, Marvin J.	Surgeon Overall	245	208	5	2.40	1.86	2.96	(0.96, 6.92)	
	Bakersfield Heart Hospital	109	93	2	2.15	2.13	2.32	(0.28, 8.39)	
	Bakersfield Memorial Hospital	113	99	3	3.03	1.70	4.10	(0.85, 11.98)	
	San Joaquin Community Hospital	23	16	0	0.00	1.34	0.00	(0.00, 39.57)	
Dhar, Naveen	Surgeon Overall	114	110	2	1.82	2.71	1.54	(0.19, 5.58)	
	Anaheim Memorial Medical Center	3	3	0	0.00	0.74	0.00	(0.00, 100.0)	
	Fountain Valley Regional Hospital and Medical Center	33	32	1	3.13	3.74	1.92	(0.05, 10.72)	
	West Anaheim Medical Center	2	2	0	0.00	4.14	0.00	(0.00, 100.0)	
	Western Medical Center - Santa Ana	8	8	1	12.50	1.54	18.67	(0.47, 100.0)	
	Western Medical Center Hospital - Anaheim	68	65	0	0.00	2.39	0.00	(0.00, 5.45)	
Dharan, Murali	Surgeon Overall	184	154	2	1.30	2.48	1.20	(0.15, 4.36)	
	John Muir Medical Center - Concord Campus	64	53	1	1.89	2.93	1.48	(0.04, 8.25)	
	San Ramon Regional Medical Center	65	55	1	1.82	1.58	2.64	(0.07, 14.74)	
	Valleycare Medical Center	55	46	0	0.00	3.03	0.00	(0.00, 6.09)	
Dhawan, Puneet	Surgeon Overall	69	63	1	1.59	1.67	2.19	(0.06, 12.21)	
	Desert Regional Medical Center	26	22	0	0.00	2.02	0.00	(0.00, 19.13)	
	Eisenhower Medical Center	2	2	0	0.00	7.69	0.00	(0.00, 55.17)	
	Los Angeles County/Harbor - UCLA Medical Center	41	39	1	2.56	1.16	5.08	(0.13, 28.34)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Dhillon, Jatinder S.	Surgeon Overall	233	201	4	1.99	2.15	2.13	(0.58, 5.46)	
	John Muir Medical Center - Concord Campus	190	164	3	1.83	2.26	1.86	(0.38, 5.43)	
	John Muir Medical Center - Walnut Creek Campus	1	1	0	0.00	5.76	0.00	(0.00, 100.0)	
	Kaiser Foundation Hospital (Geary San Francisco)	41	35	1	2.86	1.45	4.54	(0.12, 25.33)	
	San Ramon Regional Medical Center	1	1	0	0.00	3.44	0.00	(0.00, 100.0)	
Dox, Hector A.	Surgeon Overall	19	18	0	0.00	1.44	0.00	(0.00, 32.69)	
	Salinas Valley Memorial Hospital	19	18	0	0.00	1.44	0.00	(0.00, 32.69)	
Durzinsky, Dennis S.	Surgeon Overall	142	121	1	0.83	1.51	1.26	(0.03, 7.01)	
	Alta Bates Summit Medical Center - Summit Campus	142	121	1	0.83	1.51	1.26	(0.03, 7.01)	
Edwards, Phyllis A.	Surgeon Overall	109	98	3	3.06	2.94	2.40	(0.49, 7.01)	
	Kaweah Delta Medical Center	109	98	3	3.06	2.94	2.40	(0.49, 7.01)	
Egrie, Glenn D.	Surgeon Overall	1	1	0	0.00	1.00	0.00	(0.00, 100.0)	
	California Pacific Medical Center - Pacific Campus	1	1	0	0.00	1.00	0.00	(0.00, 100.0)	
Ehrman, Walter J.	Surgeon Overall	5	5	0	0.00	1.42	0.00	(0.00, 100.0)	
	Desert Regional Medical Center	5	5	0	0.00	1.42	0.00	(0.00, 100.0)	
Ellis, Robert J.	Surgeon Overall	67	61	2	3.28	2.20	3.43	(0.42, 12.40)	
	California Pacific Medical Center - Pacific Campus	4	3	0	0.00	1.31	0.00	(0.00, 100.0)	
	Marin General Hospital	53	50	2	4.00	2.39	3.85	(0.47, 13.93)	
	St. Mary's Medical Center, San Francisco	10	8	0	0.00	1.35	0.00	(0.00, 78.63)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Ennix, Coyness L.	Surgeon Overall	53	49	1	2.04	2.22	2.11	(0.05, 11.76)	
	Alta Bates Summit Medical Center - Summit Campus	53	49	1	2.04	2.22	2.11	(0.05, 11.76)	
Esmailian, Fardad	Surgeon Overall	148	100	1	1.00	2.51	0.92	(0.02, 5.11)	
	Ronald Reagan UCLA Medical Center	141	93	1	1.08	2.55	0.97	(0.02, 5.40)	
	Santa Monica - UCLA Medical Center and Orthopedic Hospital	7	7	0	0.00	1.91	0.00	(0.00, 63.42)	
Estioko, Manuel R.	Surgeon Overall	48	33	0	0.00	1.15	0.00	(0.00, 22.38)	
	St. John's Health Center	48	33	0	0.00	1.15	0.00	(0.00, 22.38)	
Eugene, John	Surgeon Overall	38	30	0	0.00	4.32	0.00	(0.00, 6.54)	
	Anaheim Memorial Medical Center	24	18	0	0.00	2.50	0.00	(0.00, 18.84)	
	Torrance Memorial Medical Center	2	2	0	0.00	3.22	0.00	(0.00, 100.0)	
	West Anaheim Medical Center	4	4	0	0.00	15.07	0.00	(0.00, 14.07)	
	Western Medical Center Hospital - Anaheim	8	6	0	0.00	2.99	0.00	(0.00, 47.36)	
Faber, Luke A.	Surgeon Overall	148	113	2	1.77	2.19	1.85	(0.22, 6.70)	
	French Hospital Medical Center	110	86	1	1.16	2.20	1.21	(0.03, 6.77)	
	Marian Medical Center	30	21	0	0.00	1.31	0.00	(0.00, 30.88)	
	Sierra Vista Regional Medical Center	8	6	1	16.67	5.17	7.41	(0.19, 41.29)	
Faraci, Philip A.	Surgeon Overall	23	23	2	8.70	2.58	7.76	(0.94, 28.05)	
	Enloe Medical Center	2	2	0	0.00	8.78	0.00	(0.00, 48.29)	
	Mercy Medical Center - Redding	1	1	0	0.00	0.41	0.00	(0.00, 100.0)	
	Rideout Memorial Hospital	19	19	2	10.53	2.15	11.27	(1.37, 40.73)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Faraci, Philip A.	Shasta Regional Medical Center	1	1	0	0.00	0.45	0.00	(0.00, 100.0)	
Fee, Henry J.	Surgeon Overall	106	86	3	3.49	3.13	2.56	(0.53, 7.49)	
	Good Samaritan Hospital - San Jose	64	52	1	1.92	2.77	1.60	(0.04, 8.90)	
	O'Connor Hospital	42	34	2	5.88	3.69	3.67	(0.44, 13.26)	
Felahy, Isam	Surgeon Overall	132	120	4	3.33	2.10	3.65	(0.99, 9.35)	
	Dameron Hospital	11	10	0	0.00	2.00	0.00	(0.00, 42.51)	
	St. Joseph's Medical Center of Stockton	121	110	4	3.64	2.11	3.96	(1.08, 10.15)	
Fischbein, Michael P.	Surgeon Overall	60	44	0	0.00	2.61	0.00	(0.00, 7.40)	
	El Camino Hospital	14	12	0	0.00	3.02	0.00	(0.00, 23.39)	
	Regional Medical of San Jose	5	5	0	0.00	2.51	0.00	(0.00, 67.57)	
	Santa Clara Valley Medical Center	10	9	0	0.00	0.95	0.00	(0.00, 98.77)	
	Stanford Hospital	31	18	0	0.00	3.18	0.00	(0.00, 14.82)	
Floridia, Rosario	Surgeon Overall	148	115	1	0.87	2.08	0.96	(0.02, 5.36)	
	Loma Linda University Medical Center	148	115	1	0.87	2.08	0.96	(0.02, 5.36)	
Folkerth, Theodore L.	Surgeon Overall	214	169	4	2.37	1.63	3.33	(0.91, 8.53)	
	Tri-City Medical Center	215	170	4	2.35	1.63	3.31	(0.90, 8.48)	
Fontana, Gregory P.	Surgeon Overall	57	40	1	2.50	1.58	3.63	(0.09, 20.22)	
	Cedars Sinai Medical Center	57	40	1	2.50	1.58	3.63	(0.09, 20.22)	
Freyaldenhoven, Stephen J.	Surgeon Overall	152	114	1	0.88	2.16	0.93	(0.02, 5.19)	
	French Hospital Medical Center	61	42	0	0.00	2.17	0.00	(0.00, 9.31)	
	Marian Medical Center	80	61	1	1.64	1.92	1.96	(0.05, 10.95)	
	Sierra Vista Regional Medical Center	11	11	0	0.00	3.51	0.00	(0.00, 22.00)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Fung, Lit K.	Surgeon Overall	321	239	3	1.26	2.04	1.42	(0.29, 4.14)	
	Doctors Medical Center	34	27	0	0.00	1.21	0.00	(0.00, 25.98)	
	Memorial Medical Center Modesto	287	212	3	1.42	2.14	1.52	(0.31, 4.44)	
Gates, Richard N.	Surgeon Overall	93	74	0	0.00	1.77	0.00	(0.00, 6.49)	
	Mission Hospital Regional Medical Center	1	0	.	.	.	.		Not Applicable
	Saddleback Memorial Medical Center	3	0	.	.	.	.		Not Applicable
	St. Joseph Hospital - Orange	88	74	0	0.00	1.77	0.00	(0.00, 6.49)	
	St. Jude Medical Center	1	0	.	.	.	.		Not Applicable
Gaudiani, Vincent A.	Surgeon Overall	205	101	3	2.97	2.10	3.25	(0.67, 9.50)	
	California Pacific Medical Center - Pacific Campus	100	55	2	3.64	2.55	3.27	(0.40, 11.83)	
	Community Hospital Monterey Peninsula	31	14	0	0.00	1.65	0.00	(0.00, 36.66)	
	Sequoia Hospital	74	32	1	3.13	1.52	4.73	(0.12, 26.35)	
Gharavi, Mohammad A.	Surgeon Overall	227	180	4	2.22	2.03	2.51	(0.68, 6.43)	
	Los Robles Hospital and Medical Center	59	43	1	2.33	2.51	2.13	(0.05, 11.86)	
	Providence Tarzana Medical Center	117	91	3	3.30	2.18	3.48	(0.72, 10.17)	
	West Hills Hospital and Medical Center	51	46	0	0.00	1.30	0.00	(0.00, 14.18)	
Gheissari, Ali	Surgeon Overall	237	176	2	1.14	2.37	1.10	(0.13, 3.98)	
	Glendale Adventist Medical Center - Wilson Terrace	20	14	0	0.00	1.22	0.00	(0.00, 49.76)	
	Good Samaritan Hospital - Los Angeles	157	119	2	1.68	2.43	1.59	(0.19, 5.74)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Gheissari, Ali	Methodist Hospital of Southern California	5	4	0	0.00	4.96	0.00	(0.00, 42.75)	
	Providence St. Joseph Medical Center	26	14	0	0.00	1.80	0.00	(0.00, 33.61)	
	St. Vincent Medical Center	29	25	0	0.00	2.65	0.00	(0.00, 12.82)	
Gibson, Christopher F.	Surgeon Overall	332	273	12	4.40	2.86	3.53	(1.83, 6.17)	
	Riverside Community Hospital	60	47	2	4.26	3.35	2.92	(0.35, 10.54)	
	St. Bernardine Medical Center	160	123	7	5.69	2.86	4.57	(1.84, 9.42)	
	St. Mary Regional Medical Center	112	103	3	2.91	2.63	2.54	(0.52, 7.43)	
Giritsky, Alexander S.	Surgeon Overall	147	113	2	1.77	3.41	1.19	(0.14, 4.31)	
	Scripps Memorial Hospital - La Jolla	147	113	2	1.77	3.41	1.19	(0.14, 4.31)	
Golts, Eugene M.	Surgeon Overall	21	17	1	5.88	2.22	6.09	(0.15, 33.93)	
	UCSD Medical Center	15	12	1	8.33	2.38	8.04	(0.20, 44.84)	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	6	5	0	0.00	1.84	0.00	(0.00, 92.27)	
Gordon, Robert T.	Surgeon Overall	61	46	2	4.35	1.78	5.62	(0.68, 20.31)	
	Kaiser Foundation Hospital (Santa Clara)	61	46	2	4.35	1.78	5.62	(0.68, 20.31)	
Gottner, Robert J.	Surgeon Overall	191	160	0	0.00	2.91	0.00	(0.00, 1.82)	Better
	Glendale Adventist Medical Center - Wilson Terrace	3	3	0	0.00	1.87	0.00	(0.00, 100.0)	
	Good Samaritan Hospital - Los Angeles	40	35	0	0.00	3.53	0.00	(0.00, 6.87)	
	Huntington Memorial Hospital	1	1	0	0.00	3.26	0.00	(0.00, 100.0)	
	Methodist Hospital of Southern California	96	80	0	0.00	3.30	0.00	(0.00, 3.21)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Gottner, Robert J.	Providence St. Joseph Medical Center	43	34	0	0.00	1.55	0.00	(0.00, 16.10)	
	St. Vincent Medical Center	8	7	0	0.00	2.32	0.00	(0.00, 52.14)	
Gregory, Richard D.	Surgeon Overall	264	217	4	1.84	2.32	1.83	(0.50, 4.68)	
	Community Regional Medical Center - Fresno	25	18	0	0.00	2.17	0.00	(0.00, 21.74)	
	Dominican Hospital	7	6	0	0.00	1.38	0.00	(0.00, 100.0)	
	Fresno Heart and Surgical Hospital	182	151	4	2.65	2.22	2.74	(0.75, 7.02)	
	St. Agnes Medical Center	50	42	0	0.00	2.86	0.00	(0.00, 7.06)	
Griffith, Patrick K.	Surgeon Overall	263	206	5	2.43	2.74	2.04	(0.66, 4.76)	
	Rideout Memorial Hospital	263	206	5	2.43	2.74	2.04	(0.66, 4.76)	
Gulati, Rajeev	Surgeon Overall	96	82	2	2.44	2.64	2.13	(0.26, 7.69)	
	Pomona Valley Hospital Medical Center	96	82	2	2.44	2.64	2.13	(0.26, 7.69)	
Gundry, Steven R.	Surgeon Overall	111	64	6	9.38	3.38	6.38	(2.34, 13.90)	Worse
	Desert Regional Medical Center	111	64	6	9.38	3.38	6.38	(2.34, 13.90)	Worse
Gunupati, Venkata C.	Surgeon Overall	1	1	0	0.00	0.99	0.00	(0.00, 100.0)	
	Garfield Medical Center	1	1	0	0.00	0.99	0.00	(0.00, 100.0)	
Habibipour, Saied	Surgeon Overall	306	253	8	3.16	2.13	3.41	(1.47, 6.73)	
	Desert Regional Medical Center	302	249	8	3.21	2.14	3.44	(1.49, 6.79)	
	Eisenhower Medical Center	4	4	0	0.00	1.28	0.00	(0.00, 100.0)	
Hall, James D.	Surgeon Overall	166	100	2	2.00	3.07	1.50	(0.18, 5.42)	
	Little Company of Mary Hospital	60	41	1	2.44	3.64	1.54	(0.04, 8.59)	
	Torrance Memorial Medical Center	106	59	1	1.69	2.67	1.46	(0.04, 8.14)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Harmon, Adam L.	Surgeon Overall	52	45	0	0.00	1.25	0.00	(0.00, 15.07)	
	California Pacific Medical Center - Pacific Campus	2	2	0	0.00	0.78	0.00	(0.00, 100.0)	
	Community Hospital Monterey Peninsula	28	24	0	0.00	1.24	0.00	(0.00, 28.49)	
	Peninsula Medical Center	4	3	0	0.00	0.83	0.00	(0.00, 100.0)	
	Sequoia Hospital	18	16	0	0.00	1.41	0.00	(0.00, 37.72)	
Harper, Baron D.	Surgeon Overall	36	32	1	3.13	1.95	3.68	(0.09, 20.53)	
	Rideout Memorial Hospital	36	32	1	3.13	1.95	3.68	(0.09, 20.53)	
Hasaniya, Nahidh W.	Surgeon Overall	123	104	2	1.92	1.77	2.50	(0.30, 9.03)	
	Loma Linda University Medical Center	123	104	2	1.92	1.77	2.50	(0.30, 9.03)	
Hemp, James R.	Surgeon Overall	208	150	3	2.00	2.18	2.11	(0.44, 6.18)	
	Scripps Green Hospital	77	53	1	1.89	2.55	1.70	(0.04, 9.48)	
	Scripps Mercy Hospital	131	97	2	2.06	1.97	2.41	(0.29, 8.70)	
Hill, Arthur C.	Surgeon Overall	58	50	1	2.00	1.46	3.14	(0.08, 17.50)	
	UCSF Medical Center	58	50	1	2.00	1.46	3.14	(0.08, 17.50)	
Hom, Sophia S.	Surgeon Overall	81	78	0	0.00	2.05	0.00	(0.00, 5.30)	
	Centinela Hospital Medical Center	1	1	0	0.00	0.26	0.00	(0.00, 100.0)	
	Garfield Medical Center	68	65	0	0.00	1.95	0.00	(0.00, 6.68)	
	Good Samaritan Hospital - Los Angeles	6	6	0	0.00	2.68	0.00	(0.00, 52.75)	
	Little Company of Mary Hospital	1	1	0	0.00	0.84	0.00	(0.00, 100.0)	
	St. Vincent Medical Center	5	5	0	0.00	3.15	0.00	(0.00, 53.95)	
Hood, James S.	Surgeon Overall	208	159	4	2.52	1.23	4.72	(1.29, 12.09)	
	Kaiser Foundation Hospital (Geary San Francisco)	208	159	4	2.52	1.23	4.72	(1.29, 12.09)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Hoopes, Charles W.	Surgeon Overall	42	33	1	3.03	1.88	3.71	(0.09, 20.70)	
	UCSF Medical Center	42	33	1	3.03	1.88	3.71	(0.09, 20.70)	
Howden, Frederick M.	Surgeon Overall	95	68	6	8.82	2.57	7.90	(2.90, 17.21)	Worse
	Alvarado Hospital	78	54	6	11.11	2.46	10.36	(3.80, 22.57)	Worse
	Sharp Grossmont Hospital	10	7	0	0.00	4.09	0.00	(0.00, 29.66)	
	Tri-City Medical Center	6	6	0	0.00	1.87	0.00	(0.00, 75.44)	
Huang, Mark W.	Surgeon Overall	76	66	3	4.55	3.50	2.98	(0.62, 8.73)	
	Alvarado Hospital	1	0	.	.	.	.		Not Applicable
	Scripps Mercy Hospital	3	2	0	0.00	4.26	0.00	(0.00, 99.55)	
	Sharp Chula Vista Medical Center	71	63	3	4.76	3.52	3.11	(0.64, 9.09)	
	Sharp Grossmont Hospital	1	1	0	0.00	0.87	0.00	(0.00, 100.0)	
Huang, Ming-Lu	Surgeon Overall	280	231	8	3.46	2.29	3.48	(1.50, 6.86)	
	Beverly Hospital	21	19	2	10.53	2.12	11.39	(1.38, 41.18)	
	Citrus Valley Medical Center – IC Campus	97	76	2	2.63	2.10	2.88	(0.35, 10.41)	
	Garfield Medical Center	140	121	4	3.31	2.44	3.12	(0.85, 7.98)	
	Methodist Hospital of Southern California	20	13	0	0.00	2.49	0.00	(0.00, 26.24)	
	USC University Hospital	2	2	0	0.00	0.62	0.00	(0.00, 100.0)	
Hunter, Curtis T.	Surgeon Overall	18	14	1	7.14	3.91	4.20	(0.11, 23.43)	
	Ronald Reagan UCLA Medical Center	3	2	0	0.00	2.81	0.00	(0.00, 100.0)	
	Santa Monica - UCLA Medical Center and Orthopedic Hospital	15	12	1	8.33	4.09	4.68	(0.12, 26.11)	
Hurwitz, Andrew S.	Surgeon Overall	143	111	2	1.80	2.11	1.96	(0.24, 7.10)	
	Glendale Adventist Medical Center - Wilson Terrace	15	14	1	7.14	1.83	8.96	(0.23, 49.94)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Hurwitz, Andrew S.	Glendale Memorial Hospital and Health Center	128	97	1	1.03	2.15	1.10	(0.03, 6.14)	
Ihnken, Kai A.	Surgeon Overall	130	112	2	1.79	1.35	3.03	(0.37, 10.97)	
	Regional Medical of San Jose	6	6	0	0.00	1.73	0.00	(0.00, 81.56)	
	Santa Clara Valley Medical Center	118	100	1	1.00	1.19	1.93	(0.05, 10.74)	
	Stanford Hospital	6	6	1	16.67	3.63	10.54	(0.27, 58.78)	
Ingram, Michael T.	Surgeon Overall	333	218	3	1.38	1.90	1.66	(0.34, 4.87)	
	Sutter Memorial Hospital	333	218	3	1.38	1.90	1.66	(0.34, 4.87)	
Iyengar, Sridhara K.	Surgeon Overall	59	56	1	1.79	3.52	1.17	(0.03, 6.50)	
	Fountain Valley Regional Hospital and Medical Center	55	52	1	1.92	3.77	1.17	(0.03, 6.54)	
	Saddleback Memorial Medical Center	4	4	0	0.00	0.36	0.00	(0.00, 100.0)	
Jacobson, John G.	Surgeon Overall	90	86	1	1.16	3.13	0.85	(0.02, 4.75)	
	St. Helena Hospital	90	86	1	1.16	3.13	0.85	(0.02, 4.75)	
Jain, Sarika	Surgeon Overall	137	125	3	2.40	2.68	2.05	(0.42, 6.01)	
	Pomona Valley Hospital Medical Center	137	125	3	2.40	2.68	2.05	(0.42, 6.01)	
Jamieson, Stuart W.	Surgeon Overall	11	1	0	0.00	1.06	0.00	(0.00, 100.0)	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	11	1	0	0.00	1.06	0.00	(0.00, 100.0)	
Jones, Blanding U.	Surgeon Overall	229	220	4	1.82	1.79	2.33	(0.64, 5.97)	
	Kaiser Foundation Hospital (Sunset)	206	198	4	2.02	1.82	2.55	(0.69, 6.52)	
	St. Bernardine Medical Center	23	22	0	0.00	1.53	0.00	(0.00, 25.28)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Joyo, Colin I.	Surgeon Overall	151	117	1	0.85	1.50	1.31	(0.03, 7.32)	
	Hoag Memorial Hospital Presbyterian	151	117	1	0.85	1.50	1.31	(0.03, 7.32)	
Kallin, Kristopher	Surgeon Overall	1	0	.	.	.	.		Not Applicable
	Kaiser Foundation Hospital (Sunset)	1	0	.	.	.	.		Not Applicable
Kamlot, Andreas	Surgeon Overall	198	168	4	2.38	2.16	2.54	(0.69, 6.50)	
	John Muir Medical Center - Concord Campus	198	168	4	2.38	2.16	2.54	(0.69, 6.50)	
Kaplon, Richard J.	Surgeon Overall	414	279	1	0.36	1.91	0.43	(0.01, 2.40)	
	Mercy General Hospital	406	273	1	0.37	1.81	0.47	(0.01, 2.60)	
	Mercy San Juan Hospital	8	6	0	0.00	6.61	0.00	(0.00, 21.40)	
Kass, Robert M.	Surgeon Overall	99	67	1	1.49	1.64	2.09	(0.05, 11.65)	
	Cedars Sinai Medical Center	99	67	1	1.49	1.64	2.09	(0.05, 11.65)	
Khan, Aziz A.	Surgeon Overall	23	21	0	0.00	1.36	0.00	(0.00, 29.66)	
	Beverly Hospital	22	20	0	0.00	1.37	0.00	(0.00, 30.87)	
	Presbyterian Intercommunity Hospital	1	1	0	0.00	1.12	0.00	(0.00, 100.0)	
Khan, Junaid H.	Surgeon Overall	203	163	2	1.23	2.20	1.28	(0.16, 4.64)	
	Alta Bates Summit Medical Center - Summit Campus	203	163	2	1.23	2.20	1.28	(0.16, 4.64)	
Khan, Tanveer A.	Surgeon Overall	3	2	0	0.00	0.79	0.00	(0.00, 100.0)	
	John Muir Medical Center - Concord Campus	3	2	0	0.00	0.79	0.00	(0.00, 100.0)	
Khwaja, Shamsuddin	Surgeon Overall	317	263	7	2.66	2.72	2.25	(0.91, 4.64)	
	Community Regional Medical Center - Fresno	210	167	3	1.80	2.91	1.42	(0.29, 4.14)	
	Dominican Hospital	2	2	1	50.00	7.40	15.53	(0.39, 86.56)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Khwaja, Shamsuddin	Fresno Heart and Surgical Hospital	57	52	2	3.85	1.68	5.25	(0.64, 18.97)	
	St. Agnes Medical Center	48	42	1	2.38	2.99	1.83	(0.05, 10.20)	
Kincade, Robert C.	Surgeon Overall	266	204	3	1.47	2.28	1.48	(0.31, 4.33)	
	Shasta Regional Medical Center	1	1	0	0.00	2.11	0.00	(0.00, 100.0)	
	Sutter Memorial Hospital	265	203	3	1.48	2.28	1.49	(0.31, 4.35)	
Klingman, Robert R.	Surgeon Overall	253	227	8	3.52	3.24	2.50	(1.08, 4.92)	
	Queen of the Valley Hospital	239	214	6	2.80	3.23	1.99	(0.73, 4.34)	
	Santa Rosa Memorial Hospital	14	13	2	15.38	3.44	10.27	(1.24, 37.11)	
Kochamba, Gary S.	Surgeon Overall	281	174	4	2.30	2.63	2.01	(0.55, 5.15)	
	Kaiser Foundation Hospital (Sunset)	225	120	4	3.33	3.04	2.52	(0.69, 6.45)	
	St. Bernardine Medical Center	56	54	0	0.00	1.71	0.00	(0.00, 9.19)	
Korver, Keith F.	Surgeon Overall	218	164	2	1.22	1.69	1.66	(0.20, 6.00)	
	Marin General Hospital	40	28	0	0.00	2.10	0.00	(0.00, 14.45)	
	Santa Rosa Memorial Hospital	31	27	0	0.00	1.72	0.00	(0.00, 18.30)	
	Sutter Medical Center of Santa Rosa	147	109	2	1.83	1.58	2.67	(0.32, 9.66)	
Koumjian, Michael P.	Surgeon Overall	176	151	6	3.97	2.72	3.35	(1.23, 7.30)	
	Alvarado Hospital	7	5	0	0.00	2.76	0.00	(0.00, 61.54)	
	Scripps Mercy Hospital	18	16	1	6.25	3.02	4.75	(0.12, 26.48)	
	Sharp Chula Vista Medical Center	32	27	0	0.00	3.68	0.00	(0.00, 8.53)	
	Sharp Grossmont Hospital	89	75	3	4.00	2.19	4.20	(0.87, 12.27)	
	Shasta Regional Medical Center	30	28	2	7.14	3.05	5.39	(0.65, 19.49)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Kriett, Jolene M.	Surgeon Overall	3	1	0	0.00	0.62	0.00	(0.00, 100.0)	
	UCSD Medical Center	1	0	.	.	.	.		Not Applicable
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	2	1	0	0.00	0.62	0.00	(0.00, 100.0)	
Kwon, Murray H.	Surgeon Overall	7	5	0	0.00	0.98	0.00	(0.00, 100.0)	
	Ronald Reagan UCLA Medical Center	7	5	0	0.00	0.98	0.00	(0.00, 100.0)	
Labourene, Jay I.	Surgeon Overall	155	115	2	1.74	1.65	2.42	(0.29, 8.76)	
	Kaiser Foundation Hospital (Geary San Francisco)	155	115	2	1.74	1.65	2.42	(0.29, 8.76)	
Laks, Hillel	Surgeon Overall	73	28	0	0.00	2.08	0.00	(0.00, 14.55)	
	Ronald Reagan UCLA Medical Center	73	28	0	0.00	2.08	0.00	(0.00, 14.55)	
Lam, Tuan T.	Surgeon Overall	4	3	0	0.00	3.37	0.00	(0.00, 83.94)	
	Fountain Valley Regional Hospital and Medical Center	4	3	0	0.00	3.37	0.00	(0.00, 83.94)	
Lapunzina, Paul M.	Surgeon Overall	206	155	1	0.65	2.03	0.73	(0.02, 4.07)	
	Kaiser Foundation Hospital (Geary San Francisco)	206	155	1	0.65	2.03	0.73	(0.02, 4.07)	
Lee, Anthony W.	Surgeon Overall	158	144	3	2.08	1.49	3.21	(0.66, 9.38)	
	Downey Regional Medical Center	79	72	2	2.78	1.44	4.43	(0.54, 16.01)	
	St. Francis Medical Center	79	72	1	1.39	1.54	2.07	(0.05, 11.53)	
Lee, Hon S	Surgeon Overall	123	88	1	1.14	1.65	1.58	(0.04, 8.83)	
	Alta Bates Summit Medical Center - Summit Campus	82	61	0	0.00	1.60	0.00	(0.00, 8.69)	
	Kaiser Foundation Hospital (Santa Clara)	41	27	1	3.70	1.76	4.84	(0.12, 26.98)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Lee, Kenneth T.	Surgeon Overall	93	90	3	3.33	3.37	2.27	(0.47, 6.64)	
	O'Connor Hospital	24	22	0	0.00	1.84	0.00	(0.00, 20.92)	
	Washington Hospital - Fremont	69	68	3	4.41	3.87	2.62	(0.54, 7.67)	
Lee, Sang H.	Surgeon Overall	261	240	7	2.92	2.43	2.76	(1.11, 5.68)	
	O'Connor Hospital	77	66	2	3.03	3.71	1.88	(0.23, 6.79)	
	Washington Hospital - Fremont	184	174	5	2.87	1.95	3.39	(1.10, 7.91)	
Lee, Vincent G.	Surgeon Overall	2	2	0	0.00	0.96	0.00	(0.00, 100.0)	
	St. Vincent Medical Center	2	2	0	0.00	0.96	0.00	(0.00, 100.0)	
Lemire, Guy G.	Surgeon Overall	90	74	2	2.70	2.15	2.89	(0.35, 10.44)	
	Anaheim Memorial Medical Center	78	63	1	1.59	2.01	1.82	(0.05, 10.14)	
	Enloe Medical Center	3	3	0	0.00	1.80	0.00	(0.00, 100.0)	
	Long Beach Memorial Medical Center	4	3	1	33.33	6.52	11.74	(0.30, 65.48)	
	West Anaheim Medical Center	5	5	0	0.00	1.57	0.00	(0.00, 100.0)	
Lemoine, Philippe H.	Surgeon Overall	26	21	0	0.00	2.44	0.00	(0.00, 16.57)	
	Centinela Hospital Medical Center	17	16	0	0.00	2.89	0.00	(0.00, 18.32)	
	Glendale Adventist Medical Center - Wilson Terrace	1	1	0	0.00	0.42	0.00	(0.00, 100.0)	
	Little Company of Mary Hospital	8	4	0	0.00	1.12	0.00	(0.00, 100.0)	
Lin, Yuan H.	Surgeon Overall	385	332	13	3.92	2.92	3.08	(1.64, 5.27)	
	Alvarado Hospital	31	28	1	3.57	2.09	3.93	(0.10, 21.90)	
	Scripps Mercy Hospital	11	10	0	0.00	0.99	0.00	(0.00, 85.86)	
	Sharp Chula Vista Medical Center	119	109	3	2.75	2.74	2.31	(0.48, 6.75)	
	Sharp Grossmont Hospital	224	185	9	4.86	3.26	3.43	(1.57, 6.51)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Longoria, James	Surgeon Overall	277	192	2	1.04	2.94	0.81	(0.10, 2.94)	
	Mercy General Hospital	1	1	0	0.00	2.22	0.00	(0.00, 100.0)	
	Sutter Memorial Hospital	276	191	2	1.05	2.94	0.82	(0.10, 2.95)	
MacMillan, James C.	Surgeon Overall	80	57	3	5.26	3.50	3.46	(0.71, 10.10)	
	Doctors Medical Center	75	52	3	5.77	3.56	3.72	(0.77, 10.88)	
	Memorial Medical Center Modesto	5	5	0	0.00	2.84	0.00	(0.00, 59.71)	
Madani, Michael M.	Surgeon Overall	97	55	0	0.00	2.15	0.00	(0.00, 7.17)	
	UCSD Medical Center	7	2	0	0.00	29.47	0.00	(0.00, 14.40)	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	90	53	0	0.00	1.12	0.00	(0.00, 14.27)	
Magliato, Kathy E.	Surgeon Overall	21	19	1	5.26	1.22	9.94	(0.25, 55.43)	
	St. John's Health Center	21	19	1	5.26	1.22	9.94	(0.25, 55.43)	
Mahendra, Tom	Surgeon Overall	46	43	2	4.65	1.69	6.33	(0.77, 22.88)	
	Antelope Valley Hospital	34	31	2	6.45	1.68	8.83	(1.07, 31.91)	
	Lancaster Community Hospital	12	12	0	0.00	1.71	0.00	(0.00, 41.29)	
Malekmehr, Farshad	Surgeon Overall	75	71	6	8.45	2.13	9.14	(3.35, 19.90)	Worse
	Glendale Adventist Medical Center - Wilson Terrace	1	1	0	0.00	3.14	0.00	(0.00, 100.0)	
	Valley Presbyterian Hospital	70	66	6	9.09	2.15	9.72	(3.57, 21.18)	Worse
	White Memorial Medical Center	4	4	0	0.00	1.49	0.00	(0.00, 100.0)	
Malki, Alan E.	Surgeon Overall	322	279	8	2.87	2.92	2.26	(0.98, 4.46)	
	Riverside Community Hospital	55	49	2	4.08	2.43	3.86	(0.47, 13.97)	
	St. Bernardine Medical Center	171	141	4	2.84	2.50	2.61	(0.71, 6.69)	
	St. Mary Regional Medical Center	96	89	2	2.25	3.85	1.34	(0.16, 4.85)	
Mallidi, Hari R.	Surgeon Overall	125	104	1	0.96	2.21	1.00	(0.03, 5.58)	
	El Camino Hospital	6	6	0	0.00	1.32	0.00	(0.00, 100.0)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Mallidi, Hari R.	Regional Medical of San Jose	63	52	1	1.92	2.48	1.78	(0.05, 9.94)	
	St. Agnes Medical Center	23	20	0	0.00	1.28	0.00	(0.00, 33.12)	
	Stanford Hospital	33	26	0	0.00	2.59	0.00	(0.00, 12.62)	
Mann, Michael J.	Surgeon Overall	1	1	0	0.00	1.44	0.00	(0.00, 100.0)	
	UCSF Medical Center	1	1	0	0.00	1.44	0.00	(0.00, 100.0)	
Marelli, Daniel	Surgeon Overall	17	13	1	7.69	3.70	4.77	(0.12, 26.61)	
	Ronald Reagan UCLA Medical Center	16	12	1	8.33	3.96	4.84	(0.12, 26.96)	
	Santa Monica - UCLA Medical Center and Orthopedic Hospital	1	1	0	0.00	0.62	0.00	(0.00, 100.0)	
Marmureanu, Alexandru R.	Surgeon Overall	13	13	0	0.00	1.94	0.00	(0.00, 33.64)	
	St. Vincent Medical Center	13	13	0	0.00	1.94	0.00	(0.00, 33.64)	
Mayer, Frederick W.	Surgeon Overall	295	202	6	2.97	2.80	2.44	(0.90, 5.31)	
	Kaweah Delta Medical Center	295	202	6	2.97	2.80	2.44	(0.90, 5.31)	
Mazur, Paul A.	Surgeon Overall	125	113	2	1.77	2.43	1.67	(0.20, 6.04)	
	Lakewood Regional Medical Center	24	21	0	0.00	2.76	0.00	(0.00, 14.64)	
	Long Beach Memorial Medical Center	101	92	2	2.17	2.36	2.12	(0.26, 7.66)	
McDonald, Jerome M.	Surgeon Overall	184	151	0	0.00	1.54	0.00	(0.00, 3.66)	
	Dameron Hospital	19	17	0	0.00	2.56	0.00	(0.00, 19.49)	
	St. Joseph's Medical Center of Stockton	165	134	0	0.00	1.41	0.00	(0.00, 4.51)	
McConnell, Douglas H.	Surgeon Overall	81	71	2	2.82	1.25	5.20	(0.63, 18.78)	
	Lakewood Regional Medical Center	31	26	0	0.00	1.32	0.00	(0.00, 24.71)	
	Long Beach Memorial Medical Center	41	36	2	5.56	1.11	11.49	(1.39, 41.53)	
	Rideout Memorial Hospital	6	6	0	0.00	0.91	0.00	(0.00, 100.0)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
McConnell, Douglas H.	Shasta Regional Medical Center	3	3	0	0.00	2.89	0.00	(0.00, 98.00)	
McPherson, James G.	Surgeon Overall	126	112	5	4.46	2.57	3.99	(1.30, 9.32)	
	Brotman Medical Center	1	1	0	0.00	8.36	0.00	(0.00, 100.0)	
	Centinela Hospital Medical Center	19	17	1	5.88	2.35	5.76	(0.15, 32.13)	
	Glendale Adventist Medical Center - Wilson Terrace	45	39	2	5.13	2.28	5.16	(0.63, 18.65)	
	Little Company of Mary Hospital	34	31	1	3.23	2.72	2.72	(0.07, 15.19)	
	St. Vincent Medical Center	23	21	1	4.76	2.46	4.44	(0.11, 24.76)	
	Torrance Memorial Medical Center	4	3	0	0.00	4.87	0.00	(0.00, 58.05)	
Melikian, Vicken	Surgeon Overall	208	159	1	0.63	1.66	0.87	(0.02, 4.86)	
	Kaiser Foundation Hospital (Geary San Francisco)	208	159	1	0.63	1.66	0.87	(0.02, 4.86)	
Mellinger, Douglas N.	Surgeon Overall	6	5	0	0.00	0.89	0.00	(0.00, 100.0)	
	UCSD Medical Center	4	3	0	0.00	1.01	0.00	(0.00, 100.0)	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	2	2	0	0.00	0.71	0.00	(0.00, 100.0)	
Merrick, Scot H.	Surgeon Overall	109	70	1	1.43	1.49	2.21	(0.06, 12.29)	
	UCSF Medical Center	109	70	1	1.43	1.49	2.21	(0.06, 12.29)	
Miller, David C.	Surgeon Overall	20	2	0	0.00	2.41	0.00	(0.00, 100.0)	
	Stanford Hospital	20	2	0	0.00	2.41	0.00	(0.00, 100.0)	
Milliken, Jeffrey C.	Surgeon Overall	64	39	2	5.13	2.00	5.90	(0.72, 21.34)	
	UC Irvine Medical Center	64	39	2	5.13	2.00	5.90	(0.72, 21.34)	
Mitchell, Robert S.	Surgeon Overall	80	50	0	0.00	1.75	0.00	(0.00, 9.71)	
	Stanford Hospital	80	50	0	0.00	1.75	0.00	(0.00, 9.71)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Mitruka, Surindra N.	Surgeon Overall	281	221	5	2.26	2.50	2.08	(0.68, 4.85)	
	Eisenhower Medical Center	281	221	5	2.26	2.50	2.08	(0.68, 4.85)	
Mittal, Arun K.	Surgeon Overall	5	4	0	0.00	1.39	0.00	(0.00, 100.0)	
	Little Company of Mary Hospital	3	2	0	0.00	1.53	0.00	(0.00, 100.0)	
	Torrance Memorial Medical Center	2	2	0	0.00	1.24	0.00	(0.00, 100.0)	
Mohammadzadeh, Gholam R.	Surgeon Overall	156	123	3	2.44	2.41	2.32	(0.48, 6.79)	
	Los Robles Hospital and Medical Center	61	44	2	4.55	1.74	6.01	(0.73, 21.72)	
	Providence Tarzana Medical Center	58	47	1	2.13	2.83	1.73	(0.04, 9.65)	
	St. John's Regional Medical Center	2	1	0	0.00	0.57	0.00	(0.00, 100.0)	
	West Hills Hospital and Medical Center	35	31	0	0.00	2.81	0.00	(0.00, 9.73)	
Morales, Rodolfo A.	Surgeon Overall	134	103	0	0.00	1.68	0.00	(0.00, 4.90)	
	Good Samaritan Hospital - San Jose	124	94	0	0.00	1.71	0.00	(0.00, 5.27)	
	O'Connor Hospital	10	9	0	0.00	1.35	0.00	(0.00, 70.00)	
Moreno-Cabral, Ricardo J.	Surgeon Overall	281	179	4	2.23	2.55	2.01	(0.55, 5.16)	
	Alvarado Hospital	5	5	0	0.00	4.90	0.00	(0.00, 34.64)	
	Scripps Mercy Hospital	49	37	1	2.70	2.90	2.14	(0.05, 11.93)	
	Sharp Chula Vista Medical Center	148	98	3	3.06	2.21	3.19	(0.66, 9.33)	
	Sharp Grossmont Hospital	79	39	0	0.00	2.78	0.00	(0.00, 7.82)	
Morris, Allen S.	Surgeon Overall	374	194	4	2.06	2.10	2.26	(0.62, 5.79)	
	Mercy General Hospital	357	185	4	2.16	2.14	2.32	(0.63, 5.95)	
	Mercy San Juan Hospital	17	9	0	0.00	1.24	0.00	(0.00, 76.02)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Morrissey, James D.	Surgeon Overall	242	196	7	3.57	2.05	4.00	(1.61, 8.25)	
	Dameron Hospital	8	5	0	0.00	3.54	0.00	(0.00, 47.94)	
	St. Joseph's Medical Center of Stockton	234	191	7	3.66	2.01	4.18	(1.68, 8.63)	
Mudge, Devin R.	Surgeon Overall	310	255	6	2.35	3.06	1.77	(0.65, 3.85)	
	Riverside Community Hospital	21	17	0	0.00	4.03	0.00	(0.00, 12.39)	
	St. Bernardine Medical Center	217	182	5	2.75	3.14	2.01	(0.65, 4.70)	
	St. Mary Regional Medical Center	72	56	1	1.79	2.51	1.64	(0.04, 9.13)	
Neal, Joe F.	Surgeon Overall	1	1	0	0.00	0.43	0.00	(0.00, 100.0)	
	Doctors Medical Center	1	1	0	0.00	0.43	0.00	(0.00, 100.0)	
Nucho, Ramsay C.	Surgeon Overall	118	104	0	0.00	1.91	0.00	(0.00, 4.27)	
	Glendale Adventist Medical Center - Wilson Terrace	51	45	0	0.00	1.40	0.00	(0.00, 13.45)	
	White Memorial Medical Center	67	59	0	0.00	2.30	0.00	(0.00, 6.25)	
Nuno, Ismael N.	Surgeon Overall	211	187	4	2.14	1.36	3.62	(0.99, 9.26)	
	Huntington Memorial Hospital	3	3	0	0.00	7.08	0.00	(0.00, 39.93)	
	Los Angeles County/USC Medical Center	157	138	4	2.90	1.06	6.29	(1.71, 16.11)	
	USC University Hospital	4	4	0	0.00	1.39	0.00	(0.00, 100.0)	
	White Memorial Medical Center	47	42	0	0.00	1.93	0.00	(0.00, 10.44)	
O'Dorisio, James E.	Surgeon Overall	47	38	1	2.63	1.38	4.38	(0.11, 24.40)	
	Sutter Medical Center of Santa Rosa	47	38	1	2.63	1.38	4.38	(0.11, 24.40)	
Oka, Tomomi	Surgeon Overall	46	39	4	10.26	2.05	11.51	(3.14, 29.48)	Worse
	California Pacific Medical Center - Pacific Campus	46	39	4	10.26	2.05	11.51	(3.14, 29.48)	Worse
Omari, Bassam O.	Surgeon Overall	154	137	6	4.38	2.27	4.44	(1.63, 9.68)	
	Los Angeles County/Harbor - UCLA Medical Center	148	132	6	4.55	2.25	4.63	(1.70, 10.10)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Omari, Bassam O.	St. Mary Medical Center	2	2	0	0	2.64	0	(0.00, 100.0)	
	St. Mary Regional Medical Center	4	3	0	0	2.63	0	(0.00, 100.0)	
Ott, Richard A.	Surgeon Overall	495	410	5	1.22	2.20	1.27	(0.41, 2.97)	
	Anaheim Memorial Medical Center	258	210	5	2.38	2.32	2.35	(0.77, 5.50)	
	Irvine Regional Hospital and Medical Center	78	66	0	0.00	1.94	0.00	(0.00, 6.62)	
	Saddleback Memorial Medical Center	15	14	0	0.00	1.85	0.00	(0.00, 32.82)	
	West Anaheim Medical Center	1	1	0	0.00	0.48	0.00	(0.00, 100.0)	
	Western Medical Center - Santa Ana	69	56	0	0.00	1.53	0.00	(0.00, 9.93)	
	Western Medical Center Hospital - Anaheim	74	63	0	0.00	2.78	0.00	(0.00, 4.84)	
Oury, James H.	Surgeon Overall	2	1	0	0.00	0.91	0.00	(0.00, 100.0)	
	St. Joseph's Medical Center of Stockton	2	1	0	0.00	0.91	0.00	(0.00, 100.0)	
Overton, John B.	Surgeon Overall	13	13	0	0.00	1.96	0.00	(0.00, 33.35)	
	Dameron Hospital	13	13	0	0.00	1.96	0.00	(0.00, 33.35)	
Oyer, Philip E.	Surgeon Overall	35	25	0	0.00	1.80	0.00	(0.00, 18.85)	
	Stanford Hospital	35	25	0	0.00	1.80	0.00	(0.00, 18.85)	
Palafox, Brian A.	Surgeon Overall	189	150	1	0.67	1.70	0.90	(0.02, 5.01)	
	St. Joseph Hospital - Orange	188	149	1	0.67	1.71	0.90	(0.02, 5.02)	
	Western Medical Center - Santa Ana	1	1	0	0.00	0.46	0.00	(0.00, 100.0)	
Panagiotides, George P.	Surgeon Overall	295	270	5	1.85	2.26	1.88	(0.61, 4.40)	
	Lakewood Regional Medical Center	123	111	3	2.70	2.78	2.23	(0.46, 6.53)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Panagiotides, George P.	Long Beach Memorial Medical Center	172	159	2	1.26	1.89	1.53	(0.18, 5.52)	
Park, Soon J.	Surgeon Overall	3	3	2	66.67	8.80	17.42	(2.11, 62.94)	
	California Pacific Medical Center - Pacific Campus	3	3	2	66.67	8.80	17.42	(2.11, 62.94)	
Paw, Patrick T.	Surgeon Overall	248	222	6	2.70	2.02	3.08	(1.13, 6.71)	
	Bakersfield Heart Hospital	37	35	0	0.00	3.48	0.00	(0.00, 6.96)	
	Bakersfield Memorial Hospital	149	131	4	3.05	1.61	4.36	(1.19, 11.18)	
	San Joaquin Community Hospital	62	56	2	3.57	2.05	4.00	(0.48, 14.46)	
Peck, Eric A.	Surgeon Overall	85	76	6	7.89	2.05	8.83	(3.24, 19.24)	Worse
	Bakersfield Heart Hospital	35	31	1	3.23	1.57	4.71	(0.12, 26.26)	
	Bakersfield Memorial Hospital	34	30	2	6.67	1.63	9.38	(1.14, 33.92)	
	San Joaquin Community Hospital	16	15	3	20.00	3.89	11.82	(2.44, 34.56)	Worse
Pellegrini, Daniel P.	Surgeon Overall	162	120	2	1.67	1.64	2.34	(0.28, 8.46)	
	Alta Bates Summit Medical Center - Summit Campus	162	120	2	1.67	1.64	2.34	(0.28, 8.46)	
Pelletier, Marc P.	Surgeon Overall	52	42	0	0.00	1.42	0.00	(0.00, 14.22)	
	El Camino Hospital	51	42	0	0.00	1.42	0.00	(0.00, 14.22)	
	Stanford Hospital	1	0	.	.	.	.		Not Applicable
Perch, Paul G.	Surgeon Overall	203	201	5	2.49	2.04	2.80	(0.91, 6.53)	
	Kaiser Foundation Hospital (Sunset)	185	183	5	2.73	2.11	2.98	(0.97, 6.95)	
	St. Bernardine Medical Center	18	18	0	0.00	1.39	0.00	(0.00, 33.95)	
Perelman, Michael	Surgeon Overall	1	1	1	100.00	1.10	100.00	(5.31, 100.0)	Worse
	Tri-City Medical Center	1	1	1	100.00	1.10	100.00	(5.31, 100.0)	Worse

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Perkowski, David J.	Surgeon Overall	220	189	1	0.53	2.20	0.55	(0.01, 3.08)	
	Mission Hospital Regional Medical Center	6	6	0	0.00	1.12	0.00	(0.00, 100.0)	
	Saddleback Memorial Medical Center	213	182	1	0.55	2.24	0.56	(0.01, 3.14)	
	St. Joseph Hospital - Orange	1	1	0	0.00	0.86	0.00	(0.00, 100.0)	
Perricone, Anthony	Surgeon Overall	108	100	2	2.00	2.14	2.15	(0.26, 7.76)	
	UCSD Medical Center	41	39	0	0.00	1.82	0.00	(0.00, 11.94)	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	67	61	2	3.28	2.35	3.21	(0.39, 11.61)	
Petrik, Pavel V.	Surgeon Overall	45	45	4	8.89	2.92	6.99	(1.91, 17.91)	
	Antelope Valley Hospital	34	34	4	11.76	3.32	8.14	(2.22, 20.85)	
	Lancaster Community Hospital	11	11	0	0.00	1.69	0.00	(0.00, 45.68)	
Pfeffer, Thomas A.	Surgeon Overall	244	136	0	0.00	1.82	0.00	(0.00, 3.42)	
	Kaiser Foundation Hospital (Sunset)	188	87	0	0.00	1.95	0.00	(0.00, 5.01)	
	St. Bernardine Medical Center	56	49	0	0.00	1.61	0.00	(0.00, 10.78)	
Phillips, Robert A.	Surgeon Overall	1	0	.	.	.	.		Not Applicable
	Shasta Regional Medical Center	1	0	.	.	.	.		Not Applicable
Plunkett, Mark D.	Surgeon Overall	3	0	.	.	.	.		Not Applicable
	Ronald Reagan UCLA Medical Center	3	0	.	.	.	.		Not Applicable
Poa, Li	Surgeon Overall	74	61	4	6.56	2.70	5.59	(1.52, 14.32)	
	Enloe Medical Center	74	61	4	6.56	2.70	5.59	(1.52, 14.32)	
Poirier, Robert A.	Surgeon Overall	44	32	0	0.00	1.36	0.00	(0.00, 19.52)	
	Dominican Hospital	44	32	0	0.00	1.36	0.00	(0.00, 19.52)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Pompili, Mario F.	Surgeon Overall	162	107	3	2.80	1.67	3.87	(0.80, 11.31)	
	Kaiser Foundation Hospital (Geary San Francisco)	114	79	1	1.27	1.60	1.82	(0.05, 10.16)	
	Kaiser Foundation Hospital (Santa Clara)	48	28	2	7.14	1.86	8.83	(1.07, 31.92)	
Postel, Joachim M.	Surgeon Overall	130	105	1	0.95	3.59	0.61	(0.02, 3.40)	
	St. Joseph Hospital - Eureka	130	105	1	0.95	3.59	0.61	(0.02, 3.40)	
Pottmeyer, Edward W.	Surgeon Overall	357	264	5	1.89	2.69	1.62	(0.52, 3.77)	
	Mercy Medical Center - Redding	357	264	5	1.89	2.69	1.62	(0.52, 3.77)	
Pratt, Jerry W.	Surgeon Overall	15	12	0	0.00	2.67	0.00	(0.00, 26.46)	
	UC Davis Medical Center	15	12	0	0.00	2.67	0.00	(0.00, 26.46)	
Prejean, Curtis A.	Surgeon Overall	122	103	2	1.94	2.19	2.04	(0.25, 7.36)	
	Beverly Hospital	2	1	0	0.00	0.56	0.00	(0.00, 100.0)	
	Citrus Valley Medical Center – IC Campus	64	52	1	1.92	2.19	2.01	(0.05, 11.23)	
	Garfield Medical Center	43	39	1	2.56	2.00	2.94	(0.07, 16.40)	
	Huntington Memorial Hospital	1	1	0	0.00	0.99	0.00	(0.00, 100.0)	
	Los Angeles County/USC Medical Center	2	2	0	0.00	1.75	0.00	(0.00, 100.0)	
	Methodist Hospital of Southern California	8	6	0	0.00	3.46	0.00	(0.00, 40.92)	
	USC University Hospital	2	2	0	0.00	3.89	0.00	(0.00, 100.0)	
Puig-Palomar, Miguel.	Surgeon Overall	264	220	9	4.09	2.44	3.86	(1.76, 7.32)	
	Enloe Medical Center	264	220	9	4.09	2.44	3.86	(1.76, 7.32)	
Purewal, Sarabjit S.	Surgeon Overall	313	257	4	1.56	1.87	1.91	(0.52, 4.89)	
	Bakersfield Heart Hospital	237	196	4	2.04	1.81	2.59	(0.70, 6.62)	
	Bakersfield Memorial Hospital	37	31	0	0.00	2.49	0.00	(0.00, 10.99)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Purewal, Sarabjit S.	San Joaquin Community Hospital	39	30	0	0.00	1.62	0.00	(0.00, 17.47)	
Raissi, Sharo	Surgeon Overall	96	66	1	1.52	1.69	2.06	(0.05, 11.50)	
	Cedars Sinai Medical Center	96	66	1	1.52	1.69	2.06	(0.05, 11.50)	
Raney, Aidan A.	Surgeon Overall	133	49	0	0.00	1.07	0.00	(0.00, 16.12)	
	Hoag Memorial Hospital Presbyterian	133	49	0	0.00	1.07	0.00	(0.00, 16.12)	
Rasi, Alfredo L.	Surgeon Overall	175	139	5	3.60	1.96	4.21	(1.37, 9.84)	
	Loma Linda University Medical Center	175	139	5	3.60	1.96	4.21	(1.37, 9.84)	
Rasouli, Margaret L.	Surgeon Overall	1	1	0	0.00	0.85	0.00	(0.00, 100.0)	
	Irvine Regional Hospital and Medical Center	1	1	0	0.00	0.85	0.00	(0.00, 100.0)	
Razzouk, Anees J.	Surgeon Overall	108	74	1	1.35	3.20	0.97	(0.02, 5.41)	
	Loma Linda University Medical Center	108	74	1	1.35	3.20	0.97	(0.02, 5.41)	
Reed, William H.	Surgeon Overall	108	83	0	0.00	1.37	0.00	(0.00, 7.49)	
	Community Hospital Monterey Peninsula	107	83	0	0.00	1.37	0.00	(0.00, 7.49)	
	Sequoia Hospital	1	0	.	.	.	.		Not Applicable
Reichman, Robert T.	Surgeon Overall	176	139	3	2.16	1.77	2.81	(0.58, 8.21)	
	Palomar Medical Center	176	139	3	2.16	1.77	2.81	(0.58, 8.21)	
Reitz, Bruce A.	Surgeon Overall	53	37	1	2.70	1.11	5.62	(0.14, 31.34)	
	El Camino Hospital	1	0	.	.	.	.		Not Applicable
	Stanford Hospital	52	37	1	2.70	1.11	5.62	(0.14, 31.34)	
Richter, Richard C.	Surgeon Overall	143	123	2	1.63	1.61	2.33	(0.28, 8.41)	
	Kaiser Foundation Hospital (Geary San Francisco)	143	123	2	1.63	1.61	2.33	(0.28, 8.41)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Riebman, Jerome B.	Surgeon Overall	5	5	0	0.00	4.82	0.00	(0.00, 35.19)	
	Santa Rosa Memorial Hospital	5	5	0	0.00	4.82	0.00	(0.00, 35.19)	
Robbins, Robert C.	Surgeon Overall	34	20	0	0.00	1.55	0.00	(0.00, 27.38)	
	Stanford Hospital	34	20	0	0.00	1.55	0.00	(0.00, 27.38)	
Roberts, Randall F.	Surgeon Overall	145	101	3	2.97	1.92	3.55	(0.73, 10.39)	
	Glendale Adventist Medical Center - Wilson Terrace	12	11	1	9.09	2.06	10.15	(0.26, 56.56)	
	Glendale Memorial Hospital and Health Center	133	90	2	2.22	1.90	2.68	(0.33, 9.70)	
Robertson, John M.	Surgeon Overall	112	76	3	3.95	1.97	4.61	(0.95, 13.47)	
	St. John's Health Center	112	76	3	3.95	1.97	4.61	(0.95, 13.47)	
Rosenburg, Jeffrey M.	Surgeon Overall	9	8	0	0.00	1.67	0.00	(0.00, 63.44)	
	Palomar Medical Center	9	8	0	0.00	1.67	0.00	(0.00, 63.44)	
Rossiter, Stephen J.	Surgeon Overall	145	122	1	0.82	1.32	1.43	(0.04, 7.96)	
	Mercy General Hospital	135	113	1	0.88	1.18	1.73	(0.04, 9.62)	
	Mercy San Juan Hospital	10	9	0	0.00	3.08	0.00	(0.00, 30.65)	
Sakopoulos, Andreas G.	Surgeon Overall	78	70	6	8.57	5.35	3.69	(1.35, 8.03)	
	St. Helena Hospital	78	70	6	8.57	5.35	3.69	(1.35, 8.03)	
Salem, Fakhri M.	Surgeon Overall	101	93	3	3.23	1.83	4.06	(0.84, 11.86)	
	Scripps Mercy Hospital	76	68	2	2.94	1.85	3.65	(0.44, 13.19)	
	Sharp Grossmont Hospital	3	3	0	0.00	2.52	0.00	(0.00, 100.0)	
	Shasta Regional Medical Center	22	22	1	4.55	1.66	6.30	(0.16, 35.13)	
Savage, David H.	Surgeon Overall	8	6	0	0.00	1.44	0.00	(0.00, 98.51)	
	Rideout Memorial Hospital	8	6	0	0.00	1.44	0.00	(0.00, 98.51)	
Schwartz, Steven M.	Surgeon Overall	71	53	2	3.77	2.55	3.40	(0.41, 12.30)	
	Good Samaritan Hospital - San Jose	63	47	1	2.13	2.62	1.86	(0.05, 10.39)	
	O'Connor Hospital	8	6	1	16.67	1.95	19.60	(0.50, 100.0)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Serna, Daniel L.	Surgeon Overall	364	354	3	0.85	1.84	1.06	(0.22, 3.10)	
	Kaiser Foundation Hospital (Sunset)	51	48	1	2.08	2.36	2.03	(0.05, 11.32)	
	St. Bernardine Medical Center	313	306	2	0.65	1.76	0.86	(0.10, 3.09)	
Shankar, Kuppe G.	Surgeon Overall	180	108	2	1.85	1.65	2.58	(0.31, 9.32)	
	UC Davis Medical Center	180	108	2	1.85	1.65	2.58	(0.31, 9.32)	
Sharma, Kapil.	Surgeon Overall	23	21	0	0.00	0.78	0.00	(0.00, 51.93)	
	Mercy General Hospital	23	21	0	0.00	0.78	0.00	(0.00, 51.93)	
Shemin, Richard J.	Surgeon Overall	80	46	1	2.17	2.32	2.16	(0.05, 12.02)	
	Ronald Reagan UCLA Medical Center	80	46	1	2.17	2.32	2.16	(0.05, 12.02)	
Shuman, Robert L.	Surgeon Overall	21	19	1	5.26	2.01	6.03	(0.15, 33.60)	
	Long Beach Memorial Medical Center	20	18	1	5.56	1.83	6.97	(0.18, 38.86)	
	St. Mary Medical Center	1	1	0	0.00	5.16	0.00	(0.00, 100.0)	
Silva, Raymond	Surgeon Overall	35	30	0	0.00	1.54	0.00	(0.00, 18.33)	
	Good Samaritan Hospital - San Jose	27	23	0	0.00	1.63	0.00	(0.00, 22.65)	
	O'Connor Hospital	8	7	0	0.00	1.26	0.00	(0.00, 96.17)	
Simsir, Sinan A.	Surgeon Overall	63	33	3	9.09	3.11	6.72	(1.39, 19.65)	
	Cedars Sinai Medical Center	63	33	3	9.09	3.11	6.72	(1.39, 19.65)	
Slachman, Frank N.	Surgeon Overall	390	237	3	1.27	1.99	1.46	(0.30, 4.27)	
	Mercy General Hospital	368	225	2	0.89	2.03	1.01	(0.12, 3.64)	
	Mercy San Juan Hospital	22	12	1	8.33	1.31	14.68	(0.37, 81.82)	
Smith, Larry H.	Surgeon Overall	8	6	0	0.00	3.41	0.00	(0.00, 41.52)	
	Santa Rosa Memorial Hospital	7	5	0	0.00	3.79	0.00	(0.00, 44.75)	
	Sutter Medical Center of Santa Rosa	1	1	0	0.00	1.48	0.00	(0.00, 100.0)	

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Soltero, Michael J.	Surgeon Overall	115	83	4	4.82	3.18	3.49	(0.95, 8.93)	
	Northridge Hospital Medical Center	54	40	1	2.50	2.12	2.70	(0.07, 15.08)	
	Providence Holy Cross Medical Center	51	35	2	5.71	4.28	3.07	(0.37, 11.09)	
	Providence Tarzana Medical Center	1	1	0	0.00	1.74	0.00	(0.00, 100.0)	
	West Hills Hospital and Medical Center	9	7	1	14.29	3.89	8.44	(0.21, 47.03)	
Sommerhaug, Rolf G. [#]	Surgeon Overall	43	39	0	0.00	2.31	0.00	(0.00, 9.42)	
	John Muir Medical Center - Concord Campus	43	39	0	0.00	2.31	0.00	(0.00, 9.42)	
Spowart, Gregory S.	Surgeon Overall	206	179	4	2.23	1.84	2.78	(0.76, 7.13)	
	Salinas Valley Memorial Hospital	206	179	4	2.23	1.84	2.78	(0.76, 7.13)	
Stahl, Richard D.	Surgeon Overall	179	135	8	5.93	2.62	5.21	(2.25, 10.26)	
	Scripps Memorial Hospital - La Jolla	179	135	8	5.93	2.62	5.21	(2.25, 10.26)	
Stanten, Russell D.	Surgeon Overall	169	144	3	2.08	2.05	2.33	(0.48, 6.82)	
	Alta Bates Summit Medical Center - Summit Campus	169	144	3	2.08	2.05	2.33	(0.48, 6.82)	
Starnes, Vaughn A.	Surgeon Overall	174	70	1	1.43	1.62	2.03	(0.05, 11.33)	
	Huntington Memorial Hospital	31	17	1	5.88	1.74	7.78	(0.20, 43.40)	
	USC University Hospital	143	53	0	0.00	1.58	0.00	(0.00, 10.15)	
Stefanacci, Paul R.	Surgeon Overall	41	38	0	0.00	2.12	0.00	(0.00, 10.53)	
	St. Agnes Medical Center	41	38	0	0.00	2.12	0.00	(0.00, 10.53)	
Stein, Alexander G.	Surgeon Overall	123	107	6	5.61	4.56	2.83	(1.04, 6.15)	
	Little Company of Mary Hospital	1	0	.	.	.	.		Not Applicable

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[#] Surgeon passed away and was unable to review the outcome results presented in this report.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Stein, Alexander G.	Long Beach Memorial Medical Center	3	3	1	33.33	3.60	21.28	(0.54, 100.0)	
	Los Angeles County/Harbor - UCLA Medical Center	6	6	0	0.00	4.97	0.00	(0.00, 28.43)	
	St. Mary Medical Center	113	98	5	5.10	4.57	2.57	(0.83, 6.00)	
Stewart, Robert D.	Surgeon Overall	167	136	7	5.15	3.35	3.54	(1.42, 7.29)	
	Community Regional Medical Center - Fresno	8	8	0	0.00	1.60	0.00	(0.00, 66.27)	
	Dominican Hospital	114	89	5	5.62	3.33	3.88	(1.26, 9.07)	
	Fresno Heart and Surgical Hospital	14	11	0	0.00	5.63	0.00	(0.00, 13.70)	
	St. Agnes Medical Center	31	28	2	7.14	3.02	5.44	(0.66, 19.67)	
Stoneburner, John M.	Surgeon Overall	136	76	2	2.63	1.81	3.34	(0.41, 12.09)	
	Little Company of Mary Hospital	36	23	2	8.70	1.68	11.87	(1.44, 42.89)	
	Torrance Memorial Medical Center	100	53	0	0.00	1.86	0.00	(0.00, 8.59)	
Suda, Richard W.	Surgeon Overall	128	80	3	3.75	2.24	3.84	(0.79, 11.24)	
	Glendale Adventist Medical Center - Wilson Terrace	12	11	0	0.00	1.50	0.00	(0.00, 51.35)	
	Glendale Memorial Hospital and Health Center	116	69	3	4.35	2.36	4.23	(0.87, 12.38)	
Sweezer, William P.	Surgeon Overall	12	12	0	0.00	1.79	0.00	(0.00, 39.40)	
	John Muir Medical Center - Concord Campus	12	12	0	0.00	1.79	0.00	(0.00, 39.40)	
Talieh, Yahya J.	Surgeon Overall	127	104	8	7.69	2.12	8.32	(3.60, 16.41)	Worse
	Doctors Medical Center	30	24	2	8.33	1.45	13.23	(1.60, 47.82)	
	Memorial Medical Center Modesto	97	80	6	7.50	2.33	7.41	(2.72, 16.13)	Worse

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Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Tang, Eddie	Surgeon Overall	39	35	4	11.43	3.18	8.26	(2.25, 21.16)	
	St. Mary's Medical Center, San Francisco	39	35	4	11.43	3.18	8.26	(2.25, 21.16)	
Tedesco, Dominic J.	Surgeon Overall	142	115	1	0.87	2.95	0.68	(0.02, 3.78)	
	CMH of San Buenaventura	142	115	1	0.87	2.95	0.68	(0.02, 3.78)	
Thibault, William N.	Surgeon Overall	174	158	4	2.53	1.72	3.38	(0.92, 8.66)	
	Mission Hospital Regional Medical Center	97	86	2	2.33	1.48	3.61	(0.44, 13.06)	
	Saddleback Memorial Medical Center	12	12	0	0.00	3.04	0.00	(0.00, 23.23)	
	St. Jude Medical Center	64	59	2	3.39	1.83	4.25	(0.52, 15.37)	
	Western Medical Center - Santa Ana	1	1	0	0.00	0.12	0.00	(0.00, 100.0)	
Thistlethwaite, Patricia A.	Surgeon Overall	13	11	0	0.00	1.26	0.00	(0.00, 61.42)	
	UCSD Medical Center	9	8	0	0.00	1.05	0.00	(0.00, 100.0)	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	4	3	0	0.00	1.81	0.00	(0.00, 100.0)	
Toporoff, Bruce M.	Surgeon Overall	125	99	4	4.04	3.96	2.35	(0.64, 6.01)	
	Los Robles Hospital and Medical Center	45	35	2	5.71	3.07	4.28	(0.52, 15.46)	
	St. John's Regional Medical Center	80	64	2	3.13	4.44	1.62	(0.20, 5.84)	
Tovar, Eduardo A.	Surgeon Overall	223	170	2	1.18	2.51	1.08	(0.13, 3.89)	
	Presbyterian Intercommunity Hospital	214	161	2	1.24	2.49	1.15	(0.14, 4.15)	
	St. Jude Medical Center	9	9	0	0.00	2.91	0.00	(0.00, 32.42)	
Trento, Alfredo	Surgeon Overall	132	53	0	0.00	1.22	0.00	(0.00, 13.16)	
	Cedars Sinai Medical Center	132	53	0	0.00	1.22	0.00	(0.00, 13.16)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Trivedi, Rohitkumar R.	Surgeon Overall	127	104	1	0.96	2.41	0.92	(0.02, 5.12)	
	Pomona Valley Hospital Medical Center	127	104	1	0.96	2.41	0.92	(0.02, 5.12)	
Tseng, Elaine E.	Surgeon Overall	2	2	0	0.00	1.44	0.00	(0.00, 100.0)	
	UCSF Medical Center	2	2	0	0.00	1.44	0.00	(0.00, 100.0)	
Tyner, John J.	Surgeon Overall	152	98	0	0.00	1.77	0.00	(0.00, 4.90)	
	Scripps Green Hospital	142	92	0	0.00	1.73	0.00	(0.00, 5.32)	
	Scripps Mercy Hospital	10	6	0	0.00	2.24	0.00	(0.00, 63.15)	
Tzeng, Thomas S.	Surgeon Overall	79	66	2	3.03	1.89	3.69	(0.45, 13.35)	
	Downey Regional Medical Center	65	52	2	3.85	1.77	5.00	(0.61, 18.09)	
	Presbyterian Intercommunity Hospital	14	14	0	0.00	2.33	0.00	(0.00, 26.01)	
Veeragandham, Ramesh S.	Surgeon Overall	150	112	2	1.79	2.49	1.65	(0.20, 5.96)	
	John Muir Medical Center - Concord Campus	60	45	1	2.22	2.16	2.36	(0.06, 13.16)	
	San Ramon Regional Medical Center	45	37	1	2.70	1.37	4.54	(0.12, 25.33)	
	Valleycare Medical Center	45	30	0	0.00	4.37	0.00	(0.00, 6.48)	
Vial, Conrad M.	Surgeon Overall	65	45	1	2.22	1.99	2.56	(0.06, 14.28)	
	Peninsula Medical Center	20	18	0	0.00	1.85	0.00	(0.00, 25.46)	
	Sequoia Hospital	45	27	1	3.70	2.09	4.07	(0.10, 22.70)	
Vo, Quang T.	Surgeon Overall	53	50	3	6.00	2.91	4.75	(0.98, 13.88)	
	Fountain Valley Regional Hospital and Medical Center	48	46	2	4.35	3.01	3.32	(0.40, 12.01)	
	Long Beach Memorial Medical Center	5	4	1	25.00	1.73	33.16	(0.84, 100.0)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Vunnamadala, Syam P.	Surgeon Overall	52	50	1	2.00	3.77	1.22	(0.03, 6.81)	
	Anaheim Memorial Medical Center	28	27	1	3.70	3.77	2.26	(0.06, 12.60)	
	West Anaheim Medical Center	14	14	0	0.00	4.80	0.00	(0.00, 12.62)	
	Western Medical Center Hospital - Anaheim	10	9	0	0.00	2.14	0.00	(0.00, 43.97)	
Wallace, Douglas C.	Surgeon Overall	149	119	3	2.52	2.38	2.44	(0.50, 7.13)	
	St. Agnes Medical Center	149	119	3	2.52	2.38	2.44	(0.50, 7.13)	
Wang, Nan	Surgeon Overall	257	172	1	0.58	2.23	0.60	(0.02, 3.34)	
	Loma Linda University Medical Center	132	87	1	1.15	2.63	1.00	(0.03, 5.60)	
	San Antonio Community Hospital	125	85	0	0.00	1.82	0.00	(0.00, 5.49)	
West, Phillip N.	Surgeon Overall	157	127	3	2.36	2.68	2.02	(0.42, 5.91)	
	Santa Barbara Cottage Hospital	157	127	3	2.36	2.68	2.02	(0.42, 5.91)	
Westerman, George R.	Surgeon Overall	143	107	4	3.74	2.34	3.68	(1.00, 9.42)	
	Santa Barbara Cottage Hospital	143	107	4	3.74	2.34	3.68	(1.00, 9.42)	
Wilson, Joseph W.	Surgeon Overall	272	205	6	2.93	2.84	2.37	(0.87, 5.15)	
	Eisenhower Medical Center	272	205	6	2.93	2.84	2.37	(0.87, 5.15)	
Wood, Michael N.	Surgeon Overall	167	131	3	2.29	3.75	1.40	(0.29, 4.10)	
	San Antonio Community Hospital	167	131	3	2.29	3.75	1.40	(0.29, 4.10)	
Yap, Alexander G.	Surgeon Overall	216	200	4	2.00	2.65	1.74	(0.47, 4.45)	
	Seton Medical Center	215	199	4	2.01	2.65	1.74	(0.48, 4.47)	
	St. Mary's Medical Center, San Francisco	1	1	0	0.00	2.09	0.00	(0.00, 100.0)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Yasuda, Roderick K.	Surgeon Overall	141	109	3	2.75	2.77	2.28	(0.47, 6.67)	
	Northridge Hospital Medical Center	45	41	1	2.44	2.22	2.52	(0.06, 14.07)	
	Providence Holy Cross Medical Center	78	52	1	1.92	3.15	1.40	(0.04, 7.81)	
	Providence Tarzana Medical Center	3	2	0	0.00	1.25	0.00	(0.00, 100.0)	
	West Hills Hospital and Medical Center	15	14	1	7.14	3.20	5.13	(0.13, 28.62)	
Yee, Edward S.	Surgeon Overall	4	4	0	0.00	4.15	0.00	(0.00, 51.13)	
	El Camino Hospital	1	1	0	0.00	7.97	0.00	(0.00, 100.0)	
	Salinas Valley Memorial Hospital	3	3	0	0.00	2.87	0.00	(0.00, 98.45)	
Yokoyama, Taro	Surgeon Overall	324	260	16	6.15	2.47	5.72	(3.27, 9.30)	Worse
	Centinela Hospital Medical Center	110	84	8	9.52	2.80	7.81	(3.37, 15.40)	Worse
	Good Samaritan Hospital - Los Angeles	21	18	0	0.00	2.06	0.00	(0.00, 22.84)	
	Providence St. Joseph Medical Center	45	36	0	0.00	2.49	0.00	(0.00, 9.48)	
	St. Vincent Medical Center	148	122	8	6.56	2.30	6.56	(2.83, 12.93)	Worse
Young, John A.	Surgeon Overall	5	3	0	0.00	3.36	0.00	(0.00, 84.19)	
	Palomar Medical Center	3	2	0	0.00	0.75	0.00	(0.00, 100.0)	
	Tri-City Medical Center	2	1	0	0.00	8.58	0.00	(0.00, 98.91)	
Young, Joseph N.	Surgeon Overall	162	108	1	0.93	1.55	1.37	(0.03, 7.65)	
	Rideout Memorial Hospital	2	1	0	0.00	1.30	0.00	(0.00, 100.0)	
	UC Davis Medical Center	160	107	1	0.93	1.55	1.38	(0.04, 7.71)	
Yun, Kwok L.	Surgeon Overall	216	92	0	0.00	1.66	0.00	(0.00, 5.57)	
	Kaiser Foundation Hospital (Sunset)	216	92	0	0.00	1.66	0.00	(0.00, 5.57)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

Table 4: Surgeon Risk-Adjusted Operative Mortality Results, 2007-2008

Surgeon	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Interval for RAMR	Performance Rating*
State		**36,929**	**28,711**	**659**	**2.30**				
Zhu, Henry L.	Surgeon Overall	296	240	3	1.25	1.94	1.48	(0.31, 4.34)	
	Mercy General Hospital	113	98	1	1.02	1.68	1.40	(0.04, 7.80)	
	Mercy San Juan Hospital	183	142	2	1.41	2.12	1.53	(0.19, 5.53)	
Zusman, Douglas R.	Surgeon Overall	189	138	3	2.17	1.98	2.52	(0.52, 7.38)	
	Hoag Memorial Hospital Presbyterian	189	138	3	2.17	1.98	2.52	(0.52, 7.38)	

*A surgeon is classified as “Better” if the upper or entire 95% CI of the RAMR falls below the California observed mortality rate (2.30%). A surgeon is classified as “Worse” if the lower or entire 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 left blank) if the California mortality rate falls within the 95% CI of a hospital’s RAMR.

VI. RISK MODEL FOR ADJUSTING HOSPITAL POST-OPERATIVE STROKE RATES, 2007-2008

Post-operative stroke is a fairly rare complication that can occur after CABG surgery. To assess hospital performance on this outcome, CCORP combined 2007 and 2008 data to increase the number of cases and reliability of reported data. Similar to the methodology used to assess the operative mortality rate, CCORP used a multivariable logistic regression model to determine the relationship between each of the demographic and pre-operative risk factors and the probability of post-operative stroke.

To develop the risk model, the 28,711 isolated (non-salvage) CABG surgery cases (2007-2008) were evaluated for missing data (23,966 cases had no missing data in any field and were used for the risk model parameter estimation). The 4,745 (16.5%) 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. To generate the hospital-specific results shown in this report, missing values for these 4,745 records were imputed (after risk model parameter estimation) by replacing them with the lowest risk category of the same variable (e.g., *Mitral Insufficiency* = *None/trivial/mild*). CCORP assigned the lowest risk value based on the following rationales: 1) some hospitals leave data fields blank by design when the risk factor is absent or the value is normal; 2) to maintain consistency with other major cardiac reporting programs that replace missing data 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 cases to estimate each patient's probability of post-operative stroke. CCORP summed these probabilities to estimate the expected outcome for each hospital. The risk model, based on the 2007-2008 data, is presented in Table 5 with statistically significant risk factors identified in bolded text.

GUIDE TO INTERPRETING TABLE 5: LOGISTIC REGRESSION RISK MODEL FOR POST-OPERATIVE STROKE, 2007-2008	
Coefficient	The coefficient for each explanatory factor represents the effect that factor has on a patient's likelihood of having post-operative stroke (>72 Hours for 2007 or unresolved within 24 hours for 2008) following bypass surgery. If the value is positive, it means that the characteristic is associated with an increased risk of post-operative stroke compared to not having the characteristic, while controlling for the effect of all of the other factors. If the coefficient is negative, having that characteristic is associated with a lower risk of post-operative stroke 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 post-operative stroke. For example, note that the coefficient for "Cerebrovascular Disease" is 0.538 and statistically significant. This value is positive, so it indicates that CABG patients with cerebrovascular disease are at an increased risk of post-operative stroke 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.
Odds Ratio	An odds ratio is another way of calculating the impact of each characteristic on post-operative stroke. Mathematically, the odds ratio is the antilogarithm of the coefficient value. The larger the odds ratio, the greater the impact that characteristic has on the risk of post-operative stroke. An odds ratio close to 1.0 means the effect of the characteristic is close to neutral. For example, the odds ratio for cerebrovascular disease is 1.712. This means that for patients with cerebrovascular disease, the odds of post-operative stroke is about 71% higher compared to patients without cerebrovascular disease, assuming all other risk factors are the same.

Table 5: Logistic Regression Risk Model for Post-Operative Stroke, 2007-2008

Risk Factors		Coefficient	Standard Error	p-value	Odds Ratio
Intercept		-8.052	0.562	<.0001	
Patient Age (Years)		**0.031**	**0.006**	**<.0001**	**1.032**
Gender	**Female vs. Male**	**0.438**	**0.116**	**0.0002**	**1.549**
Race	Non-White vs. White	0.043	0.116	0.709	1.044
Status of the Procedure	Elective				
	Urgent	**0.466**	**0.143**	**0.001**	**1.594**
	Emergent	**0.903**	**0.279**	**0.001**	**2.466**
Last Creatinine Level PreOp (mg/dl)		**0.686**	**0.183**	**0.0002**	**1.987**
Hypertension		0.276	0.192	0.151	1.318
Cerebrovascular Disease		**0.538**	**0.169**	**0.002**	**1.712**
Cerebrovascular Accident Timing	NO CVA				
	> 2 weeks	0.212	0.197	0.281	1.236
	<= 2 weeks	**1.908**	**0.439**	**<.0001**	**6.742**
Diabetes		0.173	0.116	0.135	1.189
Timing of Myocardial Infarction	No MI				
	21+ days ago	-0.164	0.170	0.335	0.849
	8-21 days ago	0.020	0.237	0.932	1.021
	1-7 days ago	-0.021	0.147	0.889	0.980
	Within 24 Hours	0.165	0.266	0.536	1.179
Cardiogenic Shock		0.393	0.309	0.204	1.481
NYHA Class	I, II, III				
	IV	-0.046	0.143	0.750	0.955
Ejection Fraction (%)		**-0.009**	**0.004**	**0.023**	**0.991**
Number of Diseased Vessels	None, One or Two				
	3 or More	**0.306**	**0.150**	**0.042**	**1.358**
Resuscitation		**1.023**	**0.347**	**0.003**	**2.781**
Year	2008 vs. 2007	0.075	0.117	0.520	1.078

Bolded text indicates statistical significance.
Note: Last Creatinine PreOp and Ejection Fraction were modeled using piecewise linear transformations.

Discrimination

Risk models that distinguish well between patients who have an adverse event and those who do not 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 has post-operative stroke and the other does not, the C-statistic describes the proportion of pairs where the patient with a post-operative stroke had a higher predicted risk of post-operative stroke than the patient with no stroke. C-statistics range from 0.5 to 1, with higher values indicating better discrimination. For the 2007-2008 risk model, the C-statistic was 0.720. The CCORP 2007-2008 risk model compares favorably with the Society of Thoracic Surgeons' recently published post-operative stroke model (C-statistic=0.716 for isolated CABG surgery).[10]

Calibration

Calibration refers to the ability of a risk model to match predicted and observed post-operative stroke cases. A model in which the number of observed stroke cases matches closely with the number of stroke cases predicted by the model demonstrates good calibration. Good calibration is essential for accurate 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 this post-operative stroke risk model is 0.078, indicating adequate calibration. That is, predicted post-operative stroke was consistent with actual post-operative stroke in the data.

Another way to test model calibration is to partition the data and compare observed stroke cases with predicted stroke cases in each of 10 risk groups. The 10 risk groups are created by sorting all observations by the predicted risk of post-operative stroke and then dividing the sorted observations into deciles of approximately equal size. As presented in Table 6, Risk Group 1 shows the patients in the lowest risk group. Among the 2,399 patients in this group, 4 patients had post-operative strokes, but the model predicted 8.9 cases. Assuming a Poisson distribution for a binary outcome, the predicted range of strokes for this group is 3.1 to 14.8. The observed number of 4 strokes falls within the range of predicted strokes. In fact, none of ten risk groups has either significantly fewer or significantly more post-operative strokes than were predicted by the model. Overall the risk model shows no systematic underestimation or overestimation of stroke cases at the extremes.

[10] Shahian DM, O'Brien SM, Filardo G, et al. The Society of Thoracic Surgeons 2008 cardiac surgery risk models: part 1—coronary artery bypass grafting surgery. Ann Thorac Surg 2009; 88:S2-22.

Table 6: Calibration of Risk Model for Post-Operative Stroke, 2007-2008

Risk Group	Isolated CABG Cases	Observed Post-Operative Strokes	Predicted Post-Operative Strokes	Difference	95% Confidence Interval of Predicted Deaths
1	2,399	4	8.9	4.9	(3.1, 14.8)
2	2,396	10	13.1	3.1	(6.0, 20.2)
3	2,399	8	16.4	8.4	(8.4, 24.3)
4	2,397	17	19.6	2.6	(10.9, 28.3)
5	2,397	30	23.4	-6.6	(13.9, 32.9)
6	2,396	35	27.9	-7.1	(17.6, 38.3)
7	2,398	38	33.6	-4.5	(22.2, 44.9)
8	2,397	48	41.7	-6.3	(29.1, 54.4)
9	2,397	57	55.4	-1.6	(40.8, 69.9)
10	2,390	101	108.0	7.0	(87.6, 128.4)
Total	**23,966**	**348**	**348.0**	**0**	

VII. RISK-ADJUSTED POST-OPERATIVE STROKE RESULTS AND HOSPITAL PERFORMANCE RATINGS, 2007-2008

The risk-adjusted post-operative stroke rate (RASR) represents the best estimate of what a healthcare provider's post-operative stroke rate would have been if the provider had a patient case mix identical to the statewide average. Thus, this rate is comparable among providers because it accounts for the differences in patient severity-of-illness.

The RASR is computed first by dividing the provider's number of patient strokes by the provider's expected number of patient strokes (based on the risk model) to obtain the observed/expected (O/E) ratio. If the O/E ratio is greater than one, the provider has a higher stroke rate than expected based on patient mix. If the O/E ratio is less than one, the provider has a lower stroke rate than expected. The O/E ratio is then multiplied by the average state post-operative stroke rate (1.43% for 2007-2008) to obtain the provider's risk-adjusted stroke rate.

The performance rating is based on a comparison of the 95% confidence interval (CI) of each provider's RASR to the California average post-operative stroke rate. Thus, CCORP treated 2007-2008 data as a sample, and inferred the range in which each provider's true performance was likely to fall. As shown in Table 7, if the entire 95% CI of a provider's risk-adjusted stroke rate is below the state average stroke rate, indicating the provider's RASR is significantly lower than the state average, the performance rating is **"Better."** If the entire 95% CI of a provider's RASR is above the state average stroke rate, indicating the provider's risk-adjusted stroke rate is significantly higher than the state average, the performance rating is **"Worse."** If the state average stroke rate is within the 95% CI of a provider's RASR, the performance rating is **"**not different**"** and left blank.

GUIDE TO INTERPRETING TABLE 7: HOSPITAL RISK-ADJUSTED POST-OPERATIVE STROKE RESULTS, 2007-2008	
All CABG Cases	The total number of isolated and non-isolated CABG cases submitted to CCORP for 2007-2008 combined. Non-isolated CABG 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. All patients in salvage operative status are excluded from the isolated CABG cases, thus only isolated CABG cases without salvage operative status are used in calculating performance ratings.
Isolated CABG Post-op strokes	The actual number of post-operative strokes (persisting for >72 hours for 2007 data, or unresolved within 24 hours for 2008 data) for isolated CABG cases for the time period indicated. (The Society of Thoracic Surgeons changed the definition of post-op stroke when updating its version 2.52 to version 2.61).
Observed Post-op Stroke Rate	The ratio of the number of isolated CABG with post-operative stroke and the isolated CABG cases multiplied by 100: Observed Post-operative Stroke Rate = Number of Isolated CABG Post-op Strokes/Isolated CABG cases X 100.
Expected Post-op Stroke Rate	The ratio of the expected number of post-operative strokes predicted for a provider (after adjusting for its patient population) and the isolated CABG cases multiplied by 100: Expected Post-operative Stroke Rate = Number of Expected Post-operative Strokes/Number of Isolated CABG cases X 100.
Risk-Adjusted Post-Operative Stroke Rate (RASR) and 95% Confidence Interval (CI)	The Risk-Adjusted Post-operative Stroke Rate (RASR) multiplies the observed average California post-operative stroke rate by a provider's O/E ratio. The 95% confidence interval represents the confidence we have in the estimate for the RASR. The lower and upper confidence limits are calculated using Poisson exact confidence interval calculations.
Performance Rating	The performance rating is based on a comparison of each provider's risk-adjusted post-operative stroke rate and the average California observed post-operative stroke rate. This is a test of statistical significance. A provider is classified as "**Better**" if the upper 95% confidence limit of its RASR falls below the California observed post-operative stroke rate. A provider is classified as "**Worse**" if the lower 95% confidence limit of its RASR is higher than the California observed post-operative stroke rate. A provider is classified as "no different" (performance rating is left blank) if the California post-operative stroke rate falls within the confidence interval of the provider's risk-adjusted post-operative stroke rate.

2007-2008 Hospital Risk-Adjusted Post-Operative Stroke Results

Table 7 presents the risk-adjusted results for each hospital for 2007-2008. The table is sorted by geographic region and contains, for each hospital, total number of CABG surgeries performed (isolated and non-isolated combined), number of isolated CABG surgeries (excluding salvage cases), number of observed isolated CABG post-operative stroke cases, observed post-operative stroke rate, expected post-operative stroke rate predicted by the risk model, RASR and 95% CI of the RASR, and the associated hospital performance rating.

Among the 28,711 isolated CABG surgeries performed in 2007-2008, 411 patients had a post-operative stroke in-hospital, reflecting an overall rate of 1.43%. Among 411 patients with post-operative stroke, 72 (17.5%) died either in hospital or after discharge but within 30 days of CABG surgery. The observed stroke rate among hospitals ranged from 0% to 9.1%. The expected stroke rates, which are generated by the model and measure patient severity of illness, were between 0.9% and 4.7%. The risk-adjusted stroke rates, which measure hospital performance, ranged from 0% to 6.0%.

Based on the 95% confidence intervals for risk-adjusted stroke rates, 115 of 122 hospitals (94%) performed within the expected range compared to the state's average stroke rate (denoted by a blank space in the performance rating column of Table 7), one hospital performed significantly **"Better"** than the state average, and five hospitals performed significantly **"Worse"** than the state average. Hospitals marked with two asterisks (**) in Table 7 submitted statements regarding this report and are presented in Appendix A.

Table 7: Hospital Risk-Adjusted Post-Operative Stroke Results by Region, 2007-2008

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Post-op Strokes	Observed Post-op Stroke Rate (%)	Expected Post-op Stroke Rate (%)	Risk-Adjusted Post-op Stroke Rate (%, RASR)	95% Confidence Interval for RASR	Performance Rating*
State		**36,929**	**28,711**	**411**	**1.43**				
Sacramento Valley & Northern California Region	Enloe Medical Center	343	286	2	0.70	1.50	0.67	(0.08, 2.41)	
	Mercy General Hospital	1,801	1,197	23	1.92	1.25	2.20	(1.40, 3.30)	
	Mercy Medical Center - Redding	368	275	4	1.45	1.36	1.53	(0.42, 3.92)	
	Mercy San Juan Hospital	255	187	4	2.14	1.42	2.16	(0.59, 5.53)	
	Rideout Memorial Hospital	336	272	5	1.84	1.65	1.60	(0.52, 3.72)	
	Shasta Regional Medical Center	142	126	2	1.59	1.32	1.72	(0.21, 6.21)	
	St. Joseph Hospital - Eureka	135	109	0	0.00	1.45	0.00	(0.00, 3.33)	
	Sutter Memorial Hospital	874	612	10	1.63	1.38	1.70	(0.81, 3.12)	
	UC Davis Medical Center	399	264	2	0.76	1.37	0.79	(0.10, 2.86)	
San Francisco Bay Area & San Jose	Alta Bates Summit Medical Center - Summit Campus	1,336	1,070	5	0.47	1.26	0.53	(0.17, 1.23)	Better
	California Pacific Medical Center - Pacific Campus**	224	150	4	2.67	1.20	3.18	(0.87, 8.15)	
	Community Hospital Monterey Peninsula	168	122	1	0.82	1.00	1.17	(0.03, 6.51)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RASR falls below the California observed mortality rate (1.43%). A hospital is classified as "**Worse**" if the lower or entire 95% CI of the RASR is higher than the California observed mortality rate. A hospital's performance is considered "**Not Different**" from the state average (rating is left blank) if the California mortality rate falls within the 95% CI of a hospital's RASR.

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Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Post-op Strokes	Observed Post-op Stroke Rate (%)	Expected Post-op Stroke Rate (%)	Risk-Adjusted Post-op Stroke Rate (%, RASR)	95% Confidence Interval for RASR	Performance Rating*
State		**36,929**	**28,711**	**411**	**1.43**				
San Francisco Bay Area & San Jose (continued)	Dominican Hospital	178	136	7	5.15	1.42	5.17	(2.08, 10.65)	Worse
	El Camino Hospital	162	128	2	1.56	1.42	1.57	(0.19, 5.68)	
	Good Samaritan Hospital - San Jose**	278	216	7	3.24	1.20	3.88	(1.56, 7.98)	Worse
	John Muir Medical Center - Concord Campus	570	483	5	1.04	1.47	1.01	(0.33, 2.35)	
	John Muir Medical Center - Walnut Creek Campus	1	1	0	0.00	4.65	0.00	(0.00, 100.0)	
	Kaiser Foundation Hospital (Geary San Francisco)	1,075	825	10	1.21	1.24	1.40	(0.67, 2.58)	
	Kaiser Foundation Hospital (Santa Clara)	150	101	2	1.98	1.33	2.13	(0.26, 7.69)	
	Marin General Hospital	94	79	1	1.27	1.35	1.34	(0.03, 7.46)	
	O'Connor Hospital	173	148	5	3.38	1.90	2.55	(0.83, 5.95)	
	Peninsula Medical Center	48	38	2	5.26	1.28	5.89	(0.71, 21.27)	
	Queen of the Valley Hospital	347	301	3	1.00	1.53	0.93	(0.19, 2.72)	
	Regional Medical of San Jose	74	63	2	3.17	1.68	2.71	(0.33, 9.77)	

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State		**36,929**	**28,711**	**411**	**1.43**				
San Francisco Bay Area & San Jose (continued)	Salinas Valley Memorial Hospital	242	209	3	1.44	1.45	1.42	(0.29, 4.14)	
	San Ramon Regional Medical Center	111	93	1	1.08	1.08	1.42	(0.04, 7.93)	
	Santa Clara Valley Medical Center	128	109	1	0.92	0.88	1.50	(0.04, 8.34)	
	Santa Rosa Memorial Hospital	162	130	1	0.77	1.45	0.76	(0.02, 4.22)	
	Sequoia Hospital	350	189	0	0.00	1.35	0.00	(0.00, 2.06)	
	Seton Medical Center	370	325	7	2.15	1.79	1.73	(0.69, 3.55)	
	St. Helena Hospital	168	156	2	1.28	1.63	1.12	(0.14, 4.06)	
	St. Mary's Medical Center, San Francisco	60	53	2	3.77	1.50	3.60	(0.44, 12.99)	
	Stanford Hospital	292	184	0	0.00	1.18	0.00	(0.00, 2.42)	
	Sutter Medical Center of Santa Rosa	198	150	0	0.00	1.19	0.00	(0.00, 2.96)	
	UCSF Medical Center	212	156	2	1.28	1.02	1.80	(0.22, 6.50)	
	Valleycare Medical Center	100	76	0	0.00	1.62	0.00	(0.00, 4.29)	
	Washington Hospital - Fremont	253	242	5	2.07	1.43	2.07	(0.67, 4.83)	

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State		**36,929**	**28,711**	**411**	**1.43**				
Central California	Bakersfield Heart Hospital	418	355	5	1.41	1.25	1.61	(0.52, 3.76)	
	Bakersfield Memorial Hospital	333	291	10	3.44	1.31	3.77	(1.80, 6.92)	Worse
	Community Regional Medical Center - Fresno	432	361	5	1.39	1.59	1.25	(0.41, 2.92)	
	Dameron Hospital	51	45	0	0.00	1.59	0.00	(0.00, 7.39)	
	Doctors Medical Center	635	509	7	1.38	1.41	1.39	(0.56, 2.87)	
	Fresno Heart and Surgical Hospital	445	372	1	0.27	1.34	0.29	(0.01, 1.60)	
	Kaweah Delta Medical Center	608	461	6	1.30	1.55	1.20	(0.44, 2.61)	
	Marian Medical Center	197	149	2	1.34	1.44	1.34	(0.16, 4.82)	
	Memorial Medical Center Modesto	545	432	10	2.31	1.40	2.36	(1.13, 4.33)	
	San Joaquin Community Hospital	141	118	0	0.00	1.35	0.00	(0.00, 3.30)	
	St. Agnes Medical Center	598	501	5	1.00	1.55	0.92	(0.30, 2.15)	
	St. Joseph's Medical Center of Stockton	522	436	2	0.46	1.28	0.51	(0.06, 1.85)	

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State		**36,929**	**28,711**	**411**	**1.43**				
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Antelope Valley Hospital	68	65	1	1.54	1.64	1.34	(0.03, 7.47)	
	CMH of San Buenaventura	251	209	3	1.44	1.65	1.24	(0.26, 3.63)	
	French Hospital Medical Center	260	198	1	0.51	1.29	0.56	(0.01, 3.12)	
	Glendale Adventist Medical Center - Wilson Terrace	269	227	2	0.88	1.34	0.94	(0.11, 3.40)	
	Glendale Memorial Hospital and Health Center	377	256	3	1.17	1.55	1.08	(0.22, 3.16)	
	Lancaster Community Hospital	23	23	0	0.00	1.09	0.00	(0.00, 21.11)	
	Los Robles Hospital and Medical Center	212	154	2	1.30	1.51	1.23	(0.15, 4.45)	
	Northridge Hospital Medical Center	191	157	4	2.55	1.44	2.54	(0.69, 6.49)	
	Providence Holy Cross Medical Center	177	119	1	0.84	1.80	0.67	(0.02, 3.72)	
	Providence St. Joseph Medical Center	150	110	3	2.73	1.45	2.70	(0.56, 7.89)	
	Providence Tarzana Medical Center	186	147	6	4.08	1.45	4.03	(1.48, 8.77)	Worse
	Santa Barbara Cottage Hospital	300	234	2	0.85	1.52	0.81	(0.10, 2.91)	

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State		**36,929**	**28,711**	**411**	**1.43**				
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara (continued)	Sierra Vista Regional Medical Center	36	33	3	9.09	2.15	6.05	(1.25, 17.65)	
	St. John's Regional Medical Center	210	163	4	2.45	1.68	2.09	(0.57, 5.35)	
	Valley Presbyterian Hospital	70	66	1	1.52	1.43	1.52	(0.04, 8.47)	
	West Hills Hospital and Medical Center	122	110	2	1.82	1.31	1.98	(0.24, 7.16)	
Greater Los Angeles	Beverly Hospital	45	40	0	0.00	1.32	0.00	(0.00, 9.97)	
	Brotman Medical Center	1	1	0	0.00	2.98	0.00	(0.00, 100.0)	
	Cedars Sinai Medical Center	464	270	2	0.74	1.11	0.96	(0.12, 3.45)	
	Centinela Hospital Medical Center	147	118	4	3.39	1.62	3.00	(0.82, 7.67)	
	Citrus Valley Medical Center – IC Campus	162	129	3	2.33	1.37	2.43	(0.50, 7.09)	
	Downey Regional Medical Center	144	124	0	0.00	1.29	0.00	(0.00, 3.30)	
	Garfield Medical Center	252	226	2	0.88	1.67	0.76	(0.09, 2.73)	
	Good Samaritan Hospital - Los Angeles	299	243	1	0.41	1.61	0.37	(0.01, 2.03)	

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State		**36,929**	**28,711**	**411**	**1.43**				
Greater Los Angeles (continued)	Huntington Memorial Hospital	181	137	1	0.73	1.25	0.84	(0.02, 4.65)	
	Kaiser Foundation Hospital (Sunset)	1,459	1,110	18	1.62	1.46	1.59	(0.94, 2.51)	
	Lakewood Regional Medical Center	185	161	2	1.24	1.62	1.10	(0.13, 3.96)	
	Little Company of Mary Hospital	146	103	2	1.94	1.82	1.53	(0.18, 5.51)	
	Long Beach Memorial Medical Center	552	476	9	1.89	1.32	2.06	(0.94, 3.90)	
	Los Angeles County/Harbor - UCLA Medical Center	195	177	4	2.26	1.49	2.17	(0.59, 5.54)	
	Los Angeles County/USC Medical Center	199	176	0	0.00	1.08	0.00	(0.00, 2.76)	
	Methodist Hospital of Southern California	146	117	1	0.85	1.52	0.81	(0.02, 4.49)	
	Presbyterian Intercommunity Hospital	229	176	1	0.57	1.43	0.57	(0.01, 3.16)	
	Ronald Reagan UCLA Medical Center	386	224	4	1.79	1.49	1.72	(0.47, 4.40)	
	Santa Monica - UCLA Medical Center and Orthopedic Hospital	41	35	0	0.00	1.76	0.00	(0.00, 8.55)	
	St. Francis Medical Center	79	72	0	0.00	1.11	0.00	(0.00, 6.58)	

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State		**36,929**	**28,711**	**411**	**1.43**				
Greater Los Angeles (continued)	St. John's Health Center	181	128	0	0.00	1.10	0.00	(0.00, 3.73)	
	St. Mary Medical Center	116	101	0	0.00	2.03	0.00	(0.00, 2.57)	
	St. Vincent Medical Center	247	210	2	0.95	1.51	0.90	(0.11, 3.26)	
	Torrance Memorial Medical Center	214	119	2	1.68	1.46	1.65	(0.20, 5.95)	
	USC University Hospital	313	154	2	1.30	1.37	1.35	(0.16, 4.88)	
	White Memorial Medical Center	127	112	3	2.68	1.46	2.63	(0.54, 7.69)	
Inland Empire, Riverside & San Bernardino	Desert Regional Medical Center**	444	340	4	1.18	1.46	1.16	(0.31, 2.96)	
	Eisenhower Medical Center	559	432	7	1.62	1.46	1.59	(0.64, 3.27)	
	Loma Linda University Medical Center	687	520	9	1.73	1.47	1.68	(0.77, 3.19)	
	Pomona Valley Hospital Medical Center	360	311	5	1.61	1.69	1.36	(0.44, 3.18)	
	Riverside Community Hospital	516	430	3	0.70	1.50	0.66	(0.14, 1.94)	
	San Antonio Community Hospital	292	216	4	1.85	1.50	1.77	(0.48, 4.53)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RASR falls below the California observed mortality rate (1.43%). A hospital is classified as "**Worse**" if the lower or entire 95% CI of the RASR is higher than the California observed mortality rate. A hospital's performance is considered "**Not Different**" from the state average (rating is left blank) if the California mortality rate falls within the 95% CI of a hospital's RASR.

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State		**36,929**	**28,711**	**411**	**1.43**				
Inland Empire, Riverside & San Bernardino (continued)	St. Bernardine Medical Center	1,181	1,028	9	0.88	1.41	0.89	(0.41, 1.68)	
	St. Mary Regional Medical Center	366	322	4	1.24	1.48	1.2	(0.33, 3.08)	
Orange County	Anaheim Memorial Medical Center	401	329	9	2.74	1.53	2.56	(1.17, 4.85)	
	Fountain Valley Regional Hospital and Medical Center	224	213	3	1.41	1.36	1.48	(0.31, 4.33)	
	Hoag Memorial Hospital Presbyterian	473	304	5	1.64	1.18	1.99	(0.65, 4.65)	
	Irvine Regional Hospital and Medical Center	79	67	0	0.00	1.47	0.00	(0.00, 5.34)	
	Mission Hospital Regional Medical Center	271	215	2	0.93	1.09	1.22	(0.15, 4.42)	
	Saddleback Memorial Medical Center	255	217	1	0.46	1.20	0.55	(0.01, 3.05)	
	St. Joseph Hospital - Orange	277	224	5	2.23	1.28	2.49	(0.81, 5.81)	
	St. Jude Medical Center	239	212	5	2.36	1.09	3.11	(1.01, 7.25)	
	UC Irvine Medical Center	119	84	1	1.19	1.31	1.30	(0.03, 7.25)	
	West Anaheim Medical Center	29	29	0	0.00	2.42	0.00	(0.00, 7.50)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RASR falls below the California observed mortality rate (1.43%). A hospital is classified as "**Worse**" if the lower or entire 95% CI of the RASR is higher than the California observed mortality rate. A hospital's performance is considered "**Not Different**" from the state average (rating is left blank) if the California mortality rate falls within the 95% CI of a hospital's RASR.

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State		**36,929**	**28,711**	**411**	**1.43**				
Orange County (continued)	Western Medical Center - Santa Ana	90	74	2	2.70	1.25	3.09	(0.37, 11.17)	
	Western Medical Center Hospital - Anaheim	204	183	3	1.64	1.48	1.59	(0.33, 4.64)	
Greater San Diego	Alvarado Hospital	147	115	0	0.00	1.50	0.00	(0.00, 3.06)	
	Palomar Medical Center	188	149	0	0.00	1.13	0.00	(0.00, 3.12)	
	Scripps Green Hospital	230	155	2	1.29	1.28	1.44	(0.17, 5.19)	
	Scripps Memorial Hospital – La Jolla	750	517	14	2.71	1.46	2.66	(1.45, 4.46)	Worse
	Scripps Mercy Hospital	306	243	3	1.23	1.32	1.34	(0.28, 3.91)	
	Sharp Chula Vista Medical Center	394	319	6	1.88	1.64	1.64	(0.60, 3.57)	
	Sharp Grossmont Hospital	406	310	8	2.58	1.69	2.19	(0.95, 4.31)	
	Sharp Memorial Hospital	445	284	3	1.06	1.22	1.24	(0.26, 3.63)	
	Tri-City Medical Center	224	178	6	3.37	1.15	4.20	(1.54, 9.12)	Worse
	UCSD Medical Center	77	64	1	1.56	1.30	1.72	(0.04, 9.59)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RASR falls below the California observed mortality rate (1.43%). A hospital is classified as "**Worse**" if the lower or entire 95% CI of the RASR is higher than the California observed mortality rate. A hospital's performance is considered "**Not Different**" from the state average (rating is left blank) if the California mortality rate falls within the 95% CI of a hospital's RASR.

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State		**36,929**	**28,711**	**411**	**1.43**				
Greater San Diego (continued)	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	182	126	1	0.79	1.15	0.99	(0.02, 5.50)	

*A hospital is classified as "**Better**" if the upper or entire 95% CI of the RASR falls below the California observed mortality rate (1.43%). A hospital is classified as "**Worse**" if the lower or entire 95% CI of the RASR is higher than the California observed mortality rate. A hospital's performance is considered "**Not Different**" from the state average (rating is left blank) if the California mortality rate falls within the 95% CI of a hospital's RASR.

** Hospitals marked with two asterisks (**) in Table 7 submitted statements regarding this report. See Appendix A for their statements.

VIII. INTERNAL MAMMARY ARTERY USAGE BY HOSPITAL, 2008: A PROCESS MEASURE OF QUALITY

A widely accepted definition of healthcare quality contains three dimensions: process, structure, and outcomes.[11] In addition to publishing hospital outcomes (risk-adjusted operative mortality rates and risk-adjusted post-operative stroke rates), this report also assesses a process of care measure by reporting hospital use of the Internal Mammary Artery (IMA) in surgery. Although outcomes measurement permits comparison of provider performance and can be used for investigating internal processes and structures, assessing the process 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 outcomes are monitored, some healthcare quality problems can be detected long before demonstrable health 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 IMA (also known as the internal thoracic artery). Clinical literature strongly supports use of the IMA to promote long-term graft patency and patient survival, and recent research also suggests a reduction in immediate, operative mortality associated with use of the internal mammary artery rather than saphenous vein revascularization.[12] The IMA, and especially the left IMA, is considered the preferred conduit for CABG surgery of the left anterior descending (LAD) coronary artery.

Many nationally respected organizations encourage the use of IMA when appropriate. Currently, the Leapfrog Evidence-Based Hospital Referral program endorses 80% hospital adherence to IMA use. The National Quality Forum (NQF) does not endorse a specific rate but states that the goal is to raise the IMA usage rates of hospitals with low utilization. The Society of Thoracic Surgeons (STS) states that IMA use should be given primary consideration in every CABG surgery patient. Furthermore, a number of healthcare quality advocates recommend public reporting of IMA usage rates for CABG surgery.

Table 8 presents hospital results for usage of the IMA by region for 2008. Only first-time isolated CABG surgeries where the operative status is elective or urgent and the LAD was bypassed are included in calculating IMA-usage rates. The increase in the statewide IMA usage rate from 93.6% in 2007 to 95.8% in year 2008 is partly due to excluding from the denominator patients who did not have the LAD artery bypassed. This new criterion, implemented in 2008, was aimed at improving the measure by excluding from the denominators patients for whom the IMA procedure may not be appropriate. Absent this exclusion, the 2008 statewide IMA usage rate would be 94.4% – a figure that can be used to compare with earlier years' data. Five hospitals received a **"Low"** rating for 2008. Hospital IMA usage rates above the statewide average rate were not evaluated because there is no consensus on what constitutes an optimal IMA usage rate. Hospitals marked with two asterisks (**) in Table 8 submitted statements regarding this report. Their statements are presented in Appendix A.

Multivariable analyses performed by CCORP also confirm IMA use as an independent predictor of operative survival for first-time isolated CABG surgery patients whose operative status was not emergent. IMA use, tested as an independent variable in the 2007-2008 risk model for operative mortality, is a significant predictor of operative mortality (OR=0.562, 95% CI: 0.443-0.712, p-value<0.0001).

[11] Donabedian A. Evaluating the Quality of Medical Care. The Milbank Quarterly, 2005; 83(4):691-729.

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

GUIDE TO INTERPRETING TABLE 8: HOSPITAL RESULTS FOR USAGE OF IMA, 2008	
Isolated CABGs	Includes only first-time, non-cardiogenic shock isolated CABG surgeries for 2008 where the operative status was elective or urgent and the Left Anterior Descending (LAD) artery was bypassed. This number will generally be smaller than the total isolated CABG cases performed by the hospital.
Percent IMA Use	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 85.35%, i.e., two standard deviations (0.0538 X 1.96) below the hospital statewide average IMA usage rate (95.89%). Lower rates may indicate lower quality of care. IMA usage rates above the hospital statewide average IMA Usage Rate were not evaluated because there is no consensus on what constitutes an optimal rate of usage.

Table 8: Hospital Results for Usage of the Internal Mammary Artery (IMA) by Region, 2008

Region	Hospital	Isolated CABGs*	Percent IMA Use	Rating[#]
State of California		**12,007**	**95.89%**	
Sacramento Valley & Northern California Region	Enloe Medical Center	118	82.20%	Low
	Mercy General Hospital	534	99.25%	
	Mercy Medical Center - Redding	101	99.01%	
	Mercy San Juan Hospital	92	96.74%	
	Rideout Memorial Hospital	124	95.97%	
	Shasta Regional Medical Center	46	91.30%	
	St. Joseph Hospital - Eureka	45	100.00%	
	Sutter Memorial Hospital	283	98.59%	
	UC Davis Medical Center	121	99.17%	
San Francisco Bay Area & San Jose	Alta Bates Summit Medical Center - Summit Campus	478	99.37%	
	California Pacific Medical Center - Pacific Campus**	54	98.15%	
	Community Hospital Monterey Peninsula	69	100.00%	
	Dominican Hospital	56	96.43%	
	El Camino Hospital	58	100.00%	
	Good Samaritan Hospital - San Jose**	70	100.00%	
	John Muir Medical Center - Concord Campus	217	96.77%	
	Kaiser Foundation Hospital (Geary San Francisco)	292	94.86%	
	Kaiser Foundation Hospital (Santa Clara)	65	98.46%	
	Marin General Hospital	33	93.94%	
	O'Connor Hospital	53	100.00%	
	Peninsula Medical Center	25	96.00%	
	Queen of the Valley Hospital	109	99.08%	
	Regional Medical of San Jose	29	100.00%	
	Salinas Valley Memorial Hospital	99	97.98%	
	San Ramon Regional Medical Center	34	97.06%	
	Santa Clara Valley Medical Center	42	100.00%	
	Santa Rosa Memorial Hospital	36	97.22%	
	Sequoia Hospital	68	98.53%	

* Only includes first-time, non-cardiogenic shock, isolated CABGs where the operative status was elective or urgent and LAD was bypassed.
**Hospitals marked with two asterisks (**) in Table 8 submitted statements regarding this report. See Appendix A for their statements.
[#]"Low" rating: IMA usage rate for a hospital is less than 85.35%, i.e., two standard deviations (0.0538 x 1.96) below the hospital statewide average IMA usage rate (95.89%).

Table 8: Hospital Results for Usage of the Internal Mammary Artery (IMA) by Region, 2008

Region	Hospital	Isolated CABGs*	Percent IMA Use	Rating[#]
State of California		**12,007**	**95.89%**	
San Francisco Bay Area & San Jose (continued)	Seton Medical Center	166	90.36%	
	St. Helena Hospital	59	81.36%	Low
	St. Mary's Medical Center, San Francisco	18	94.44%	
	Stanford Hospital	80	97.50%	
	Sutter Medical Center of Santa Rosa	59	69.49%	Low
	UCSF Medical Center	72	97.22%	
	Valleycare Medical Center	33	100.00%	
	Washington Hospital - Fremont	93	100.00%	
Central California	Bakersfield Heart Hospital	148	91.89%	
	Bakersfield Memorial Hospital	126	97.62%	
	Community Regional Medical Center - Fresno	125	92.80%	
	Dameron Hospital	28	96.43%	
	Doctors Medical Center	203	93.10%	
	Fresno Heart and Surgical Hospital	200	93.50%	
	Kaweah Delta Medical Center	201	99.50%	
	Marian Medical Center	33	100.00%	
	Memorial Medical Center Modesto	205	91.22%	
	San Joaquin Community Hospital	46	100.00%	
	St. Agnes Medical Center	152	98.03%	
	St. Joseph's Medical Center of Stockton	211	95.73%	
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Antelope Valley Hospital	22	72.73%	Low
	CMH of San Buenaventura	85	97.65%	
	French Hospital Medical Center	78	98.72%	
	Glendale Adventist Medical Center - Wilson Terrace	98	98.98%	
	Glendale Memorial Hospital and Health Center	114	100.00%	
	Lancaster Community Hospital	5	100.00%	
	Los Robles Hospital and Medical Center	49	95.92%	
	Northridge Hospital Medical Center	89	89.89%	
	Providence Holy Cross Medical Center	48	100.00%	

* Only includes first-time, non-cardiogenic shock, isolated CABGs where the operative status was elective or urgent and LAD was bypassed.
**Hospitals marked with two asterisks (**) in Table 8 submitted statements regarding this report. See Appendix A for their statements.
[#]"Low" rating: IMA usage rate for a hospital is less than 85.35%, i.e., two standard deviations (0.0538 x 1.96) below the hospital statewide average IMA usage rate (95.89%).

Table 8: Hospital Results for Usage of the Internal Mammary Artery (IMA) by Region, 2008

Region	Hospital	Isolated CABGs*	Percent IMA Use	Rating[#]
State of California		**12,007**	**95.89%**	
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara (continued)	Providence St. Joseph Medical Center	57	100.00%	
	Providence Tarzana Medical Center	60	96.67%	
	Santa Barbara Cottage Hospital	119	96.64%	
	Sierra Vista Regional Medical Center	13	100.00%	
	St. John's Regional Medical Center	77	89.61%	
	Valley Presbyterian Hospital	26	92.31%	
	West Hills Hospital and Medical Center	41	100.00%	
Greater Los Angeles	Beverly Hospital	7	71.43%	Low
	Cedars Sinai Medical Center	119	97.48%	
	Centinela Hospital Medical Center	42	100.00%	
	Citrus Valley Medical Center – IC Campus	54	90.74%	
	Downey Regional Medical Center	50	100.00%	
	Garfield Medical Center	113	85.84%	
	Good Samaritan Hospital - Los Angeles	99	97.98%	
	Huntington Memorial Hospital	25	96.00%	
	Kaiser Foundation Hospital (Sunset)	453	94.92%	
	Lakewood Regional Medical Center	75	93.33%	
	Little Company of Mary Hospital	44	100.00%	
	Long Beach Memorial Medical Center	211	96.68%	
	Los Angeles County/Harbor - UCLA Medical Center	75	96.00%	
	Los Angeles County/USC Medical Center	79	94.94%	
	Methodist Hospital of Southern California	53	96.23%	
	Presbyterian Intercommunity Hospital	68	98.53%	
	Ronald Reagan UCLA Medical Center	86	98.84%	
	Santa Monica - UCLA Medical Center and Orthopedic Hospital	14	100.00%	
	St. Francis Medical Center	33	87.88%	
	St. John's Health Center	54	96.30%	
	St. Mary Medical Center	37	97.30%	

* Only includes first-time, non-cardiogenic shock, isolated CABGs where the operative status was elective or urgent and LAD was bypassed.
**Hospitals marked with two asterisks (**) in Table 8 submitted statements regarding this report. See Appendix A for their statements.
[#]"Low" rating: IMA usage rate for a hospital is less than 85.35%, i.e., two standard deviations (0.0538 x 1.96) below the hospital statewide average IMA usage rate (95.89%).

Table 8: Hospital Results for Usage of the Internal Mammary Artery (IMA) by Region, 2008

Region	Hospital	Isolated CABGs*	Percent IMA Use	Rating[#]
State of California		**12,007**	**95.89%**	
Greater Los Angeles (continued)	St. Vincent Medical Center	100	96.00%	
	Torrance Memorial Medical Center	53	100.00%	
	USC University Hospital	58	93.10%	
	White Memorial Medical Center	49	95.92%	
Inland Empire, Riverside & San Bernardino	Desert Regional Medical Center**	145	97.24%	
	Eisenhower Medical Center	174	94.83%	
	Loma Linda University Medical Center	222	96.85%	
	Pomona Valley Hospital Medical Center	135	98.52%	
	Riverside Community Hospital	178	94.94%	
	San Antonio Community Hospital	86	88.37%	
	St. Bernardine Medical Center	470	95.32%	
	St. Mary Regional Medical Center[†]			
Orange County	Anaheim Memorial Medical Center	109	99.08%	
	Fountain Valley Regional Hospital and Medical Center	115	93.91%	
	Hoag Memorial Hospital Presbyterian	131	97.71%	
	Irvine Regional Hospital and Medical Center	25	96.00%	
	Mission Hospital Regional Medical Center	87	96.55%	
	Saddleback Memorial Medical Center	90	98.89%	
	St. Joseph Hospital - Orange	92	100.00%	
	St. Jude Medical Center	78	100.00%	
	UC Irvine Medical Center	40	92.50%	
	West Anaheim Medical Center	13	92.31%	
	Western Medical Center - Santa Ana	34	97.06%	
	Western Medical Center Hospital - Anaheim	86	94.19%	
Greater San Diego	Alvarado Hospital	60	100.00%	
	Palomar Medical Center	60	100.00%	
	Scripps Green Hospital	77	98.70%	
	Scripps Memorial Hospital - La Jolla	233	97.42%	
	Scripps Mercy Hospital	102	98.04%	

* Only includes first-time, non-cardiogenic shock, isolated CABGs where the operative status was elective or urgent and LAD was bypassed.
**Hospitals marked with two asterisks (**) in Table 8 submitted statements regarding this report. See Appendix A for their statements.
[#]"Low" rating: IMA usage rate for a hospital is less than 85.35%, i.e., two standard deviations (0.0538 x 1.96) below the hospital statewide average IMA usage rate (95.89%).

[†]St. Mary Regional Medical Center failed to submit correct data for this measure; therefore a utilization rate could not be calculated.

Table 8: Hospital Results for Usage of the Internal Mammary Artery (IMA) by Region, 2008

Region	Hospital	Isolated CABGs*	Percent IMA Use	Rating[#]
State of California		**12,007**	**95.89%**	
Greater San Diego (continued)	Sharp Chula Vista Medical Center	105	99.05%	
	Sharp Grossmont Hospital	131	98.47%	
	Sharp Memorial Hospital	100	96.00%	
	Tri-City Medical Center	79	93.67%	
	UCSD Medical Center	31	96.77%	
	UCSD Medical Center - La Jolla, John M. & Sally B. Thornton Hospital	78	97.44%	

* Only includes first-time, non-cardiogenic shock, isolated CABGs where the operative status was elective or urgent and LAD was bypassed.
**Hospitals marked with two asterisks (**) in Table 8 submitted statements regarding this report. See Appendix A for their statements.
[#]"Low" rating: IMA usage rate for a hospital is less than 85.35%, i.e., two standard deviations (0.0538 x 1.96) below the hospital statewide average IMA usage rate (95.89%).

IX. 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 lower the patients' complications and the better the patients' health outcomes. This volume-outcome relationship has been extensively studied for patients receiving coronary artery bypass graft (CABG) surgery. Although most studies have found that hospitals and surgeons performing more CABG surgeries have better outcomes, more recent data and analyses less consistently support a clinically relevant relationship.[13,14,15,16] In the first three CCORP reports (data 2003, 2003-2004, and 2005), no relationship was found between hospital CABG surgery volume and risk-adjusted CABG hospital mortality.[17,18,19] More recent CCORP reports (data 2005-2006 and 2007) found a small but significant association between a hospital's CABG surgery volume (both isolated and total CABG surgery) and operative mortality.[20]

As mortality rates for CABG surgery have declined and become more consistent between hospitals, there has been increased interest among health policymakers and quality of care experts in examining the relationship between surgical volume and complications of surgery. Most experts suspect that the more surgical procedures a hospital performs, the lower the rate of surgical complications.

In this current report, we have expanded our previous analyses beyond the relationship between hospital volume and mortality, and have conducted additional analyses examining the relationship between hospital volume and a complication of CABG surgery (post-operative stroke). The following section presents data examining the hospital volume-outcome relationship for two clinical outcomes, hospital mortality and hospital post-operative stroke.

2007-2008 Hospital Volume-Outcome Analyses

The following analyses were conducted to examine the hospital volume-outcome relationship for both mortality and post-operative stroke in CABG surgery. The primary goal of these analyses was to use the most current methodological techniques to determine whether hospitals

[13] 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.

[14] 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.

[15] 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.

[16] Marcin JP, Li Z, Kravitz RL, Dai JJ, Rocke DM, Romano PS. The CABG surgery volume-outcome relationship: temporal trends and selection effects in California, 1998-2004. Health Serv Res. 2008; 43(1):174-92.

[17] California Office of Statewide Health Planning and Development. ***The California Report on Coronary Artery Bypass Graft Surgery 2003 Hospital Data,*** Sacramento, CA: California Office of Statewide Health Planning and Development, February 2006.

[18] California Office of Statewide Health Planning and Development. ***The California Report on Coronary Artery Bypass Graft Surgery 2003-04 Hospital and Surgeon Data,*** Sacramento, CA: California Office of Statewide Health Planning and Development, March 2007-2008.

[19] California Office of Statewide Health Planning and Development. ***The California Report on Coronary Artery Bypass Graft Surgery 2005 Hospital Data,*** Sacramento, CA: California Office of Statewide Health Planning and Development, December 2007-2008.

[20] California Office of Statewide Health Planning and Development. ***The California Report on Coronary Artery Bypass Graft Surgery 2005-2006 Hospital and Surgeon Data***, Sacramento, CA: California Office of Statewide Health Planning and Development, March 2009.

performing more procedures have lower risk-adjusted operative mortality rates and lower risk-adjusted post-operative stroke rates than hospitals 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 hospitals or surgeon CABG volume on patient-level outcomes. All of the independent variables included in the patient-level risk adjustment model were included in the hospital volume-outcome analyses.

Two definitions of volume were considered for the volume-outcome analyses of both mortality and post-operative stroke. First, "isolated CABG volume" was analyzed to assess whether there was an association between isolated CABG volume and isolated CABG mortality or post-operative stroke. 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 or post-operative stroke.

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

Results

Hospital Volume-Outcome Relationship (Operative Mortality): The 2007-2008 CCORP CABG surgery database contains detailed patient-level clinical data on 28,711 isolated CABG surgery procedures in 122 hospitals. The average annual hospital isolated CABG surgery volume was 118 cases, with a range among individual hospitals of 1 to 599. The overall operative mortality was 2.30%, and the average hospital operative mortality was 2.51%, with a range among individual hospitals of 0% to 12.90%.

In the hierarchical model, when hospital isolated CABG volume was entered into the analysis as a continuous variable, there was small but significant association with risk-adjusted operative mortality (coefficient = -0.095, standard error = 0.040, p-value = 0.018, OR = 0.925 and 95% CI = 0.841-0.984 for every additional 100 patients). When hospital total CABG volume was entered into the analysis as a continuous variable, there was no significant association with risk-adjusted operative mortality (coefficient = -0.043, standard error = 0.026, p-value = 0.107, OR = 0.958, and 95% CI = 0.911-1.008 for every additional 100 patients).

Table 9 presents the summary statistics when annualized hospital isolated CABG volume was categorized into quartiles (<200, 200-299, 300-599, >=600) and dichotomized at different threshold volumes (>=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 threshold of 450 procedures per year was chosen because of the past volume recommendations by The Leapfrog Group (www.leapfroggroup.org), and the threshold of 100

was chosen because of the past volume recommendations by the American College of Cardiology and the American Heart Association (ACC/AHA Practice Guidelines).

The data presented in Table 9 suggest lower CABG surgery mortality among higher volume hospitals. Of note, there was a significantly lower risk of isolated CABG surgery mortality when hospitals performed more than 300 surgeries per year compared to hospitals that performed less than 200 surgeries per year (OR = 0.693, 95% CI = 0.484, 0.991).

Table 9: Hospital Isolated CABG Volume Groups and Predicted Mortality Outcomes, 2007-2008

Volume Group	Hospitals (n=122) N (%)	Patients (n=28,711) N (%)	Odds Ratio (95% CI)
>=600	0 (0)	0	0
300-599	6 (5)	5,842 (20)	**0.693 (0.484, 0.991)**
200-299	11 (9)	5,197 (18)	0.905 (0.677, 1.209)
<200	105 (86)	17,672 (62)	Reference
>=450	4 (3)	4,405 (15)	0.740 (0.484, 1.131)
<450	118 (97)	24,306 (85)	Reference
>=250	10 (8)	7,889 (27)	0.752 (0.564, 1.001)
<250	112 (92)	20,822 (73)	Reference
>=100	55 (45)	21,068 (73)	0.833 (0.675, 1.028)
<100	67 (55)	7,643 (27)	Reference

Note: Bolded groups are significantly different from the reference group.

Table 10 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 show that patients have a similar risk of dying from an isolated CABG procedure regardless of the hospital's total CABG surgery annual volume.

Table 10: Hospital Total CABG Volume Groups and Predicted Mortality Outcomes, 2007-2008

Volume Group	Hospitals (n=122) N (%)	Patients (n=36,929) N (%)	Odds Ratio (95% CI)
>=600	3 (2)	4,593 (13)	0.865 (0.564, 1.329)
300-599	7 (6)	5,799 (16)	0.987 (0.617, 1.141)
200-299	16 (13)	7,781 (21)	0.877 (0.784, 1.242)
<200	96 (79)	18,756 (51)	Reference
>=450	5 (4)	6,846 (19)	0.909 (0.649, 1.275)
<450	117 (96)	30,083 (81)	Reference
>=250	17 (14)	14,249 (39)	0.876 (0.712, 1.076)
<250	105 (86)	22,680 (61)	Reference
>=100	69 (57)	30,564 (83)	0.840 (0.695, 1.015)
<100	53 (43)	6,365 (17)	Reference

Hospital Volume-Outcome Relationship (Post-Operative Stroke): The 2007-2008 CCORP CABG database contains detailed patient-level clinical data on 28,711 isolated CABG surgery procedures in 122 hospitals. The average annualized hospital isolated CABG surgery volume was 118 cases, with a range among individual hospitals of 1 to 599. The overall post-operative stroke rate was 1.43%, and the average hospital post-operative stroke rate was 1.46%, with a range among individual hospitals of 0% to 9.10%.

In the hierarchical model, when hospital isolated CABG volume was entered into the analysis as a continuous variable, there was no significant association with risk-adjusted post-operative stroke (coefficient = -0.035, standard error = 0.045, p-value = 0.939; OR = 0.966 and 95% CI = 0.884-1.055 for every additional 100 patients). When hospital total CABG volume was entered into the analysis as a continuous variable, there was also no significant association with risk-adjusted operative stroke (coefficient = 0.013, standard error = 0.032, p-value = 0.688, OR = 1.013, and 95% confidence interval = 0.952-1.078 for every additional 100 patients).

Table 11 presents the summary statistics when annualized hospital isolated CABG volume was categorized into quartiles (<200, 200-299, 300-599, >=600) and dichotomized at different threshold volumes (>=450 and <450; >=250 and <250; and >=100 and <100). The quartiles and threshold volumes were chosen because these volumes were used in the previous California volume-outcome reports. These data show that patients have a similar risk of post-operative stroke regardless of the hospital's isolated CABG surgery volume.

Table 11: Hospital Isolated CABG Volume Groups and Predicted Post-Operative Stroke Outcomes, 2007-2008

Volume Group	Hospitals (n=122) N (%)	Patients (n=28,711) N (%)	Odds Ratio (95% CI)
>=600	0 (0)	0	0
300-599	6 (5)	5,842 (20)	1.031 (0.725, 1.466)
200-299	11 (9)	5,197 (18)	1.203 (0.812, 1.784)
<200	105 (86)	17,672 (62)	Reference
>=450	4 (3)	4,405 (15)	1.026 (0.696, 1.510)
<450	118 (97)	24,306 (85)	Reference
>=250	10 (8)	7,889 (27)	1.079 (0.786, 1.481)
<250	112 (92)	20,822 (73)	Reference
>=100	55 (45)	21,068 (73)	0.979 (0.711, 1.351)
<100	67 (55)	7,643 (27)	Reference

Table 12 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 post-operative stroke regardless of the hospital's total CABG surgery annual volume.

Table 12: Hospital Total CABG Volume Groups and Predicted Post-Operative Stroke Outcomes, 2007-2008

Volume Group	Hospitals (n=122) N (%)	Patients (n=36,929) N (%)	Odds Ratio (95% CI)
>=600	3 (2)	4,593 (13)	1.059 (0.671, 1.672)
300-599	7 (6)	5,799 (16)	1.181 (0.799, 1.745)
200-299	16 (13)	7,781 (21)	1.227 (0.885, 1.700)
<200	96 (79)	18,756 (51)	Reference
>=450	5 (4)	6,846 (19)	1.005 (0.700, 1.442)
<450	117 (96)	30,083 (81)	Reference
>=250	17 (14)	14,249 (39)	1.237 (0.948, 1.613)
<250	105 (86)	22,680 (61)	Reference
>=100	69 (57)	30,564 (83)	1.248 (0.932, 1.672)
<100	53 (43)	6,365 (17)	Reference

X. USE OF CARDIAC INTERVENTION PROCEDURES AND OBSERVED IN-HOSPITAL MORTALITY

Medical innovations such as the CABG procedure and Percutaneous Coronary Interventions such as Percutaneous Transluminal Coronary Angioplasty (PTCA) and intra-coronary stents, refined 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 has largely replaced angioplasty without stents because of its lower rate of re-narrowing the arteries (restenosis). New technologies and improved adjunctive medical therapy are making percutaneous coronary intervention (PCI) a viable alternative to CABG for many patients. 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. However, CABG surgery is associated with lower rates of repeat revascularization, less overall angina, and lower long-term mortality. A more comprehensive approach to examining and reporting on the quality of revascularization procedures in California would include PCI and its outcomes.

Figure 1 shows change in the use of the two revascularization procedures, CABG and PCI, over time using data from OSHPD's Patient Discharge Data. Despite a decrease in 2008 and 2009, PCI volume increased by 14% between 1997 and 2009 in California. Increased use of drug-eluting stents and related Centers for Medicare and Medicaid Services (CMS) reimbursement policy changes may be partly responsible for this overall growth.[21] During the same timeframe, the number of isolated CABG surgeries decreased 53% between 1997 and 2009.[22] Non-isolated CABG surgery volume remained relatively constant, with a slight decline each year since 2001.

Figure 2 presents the trends in observed in-hospital mortality rates for isolated CABG surgeries, non-isolated CABG surgeries and PCIs in California between 1997 and 2009. During the 13 years between 1997 and 2009, the in-hospital mortality rate for isolated CABG surgeries declined from 3.08%, when the voluntary California CABG Mortality Reporting Program (CCMRP) was launched in 1997, to 1.69% in 2009, the seventh year of the mandatory reporting program. Meanwhile, the observed in-hospital mortality rates for non-isolated CABG surgeries also declined from 9.66% in 1997 to 5.29% in 2009. However, the observed in-hospital mortality rate for PCIs increased from 1.70% in 1997 to 1.87% in 2009, for the first time surpassing in-hospital mortality for isolated CABG surgery in California.

[21] Ryan, J and Cohen, DJ. Are drug-eluting stents cost-effective?: It depends on whom you ask. Circulation 2006; 114:1736-1744.

[22] The numbers cited for isolated CABG and PCI volume come from the OSHPD Patient Discharge Data (PDD) and the number of isolated CABGs differs from what is cited earlier in this report from the CCORP registry. Since OSHPD does not maintain a PCI data registry, only the PDD provides a consistent source of numbers for both procedures.

Figure 1: Volume of Isolated CABG, Non-Isolated CABG, and PCI Procedure in California, 1997-2009

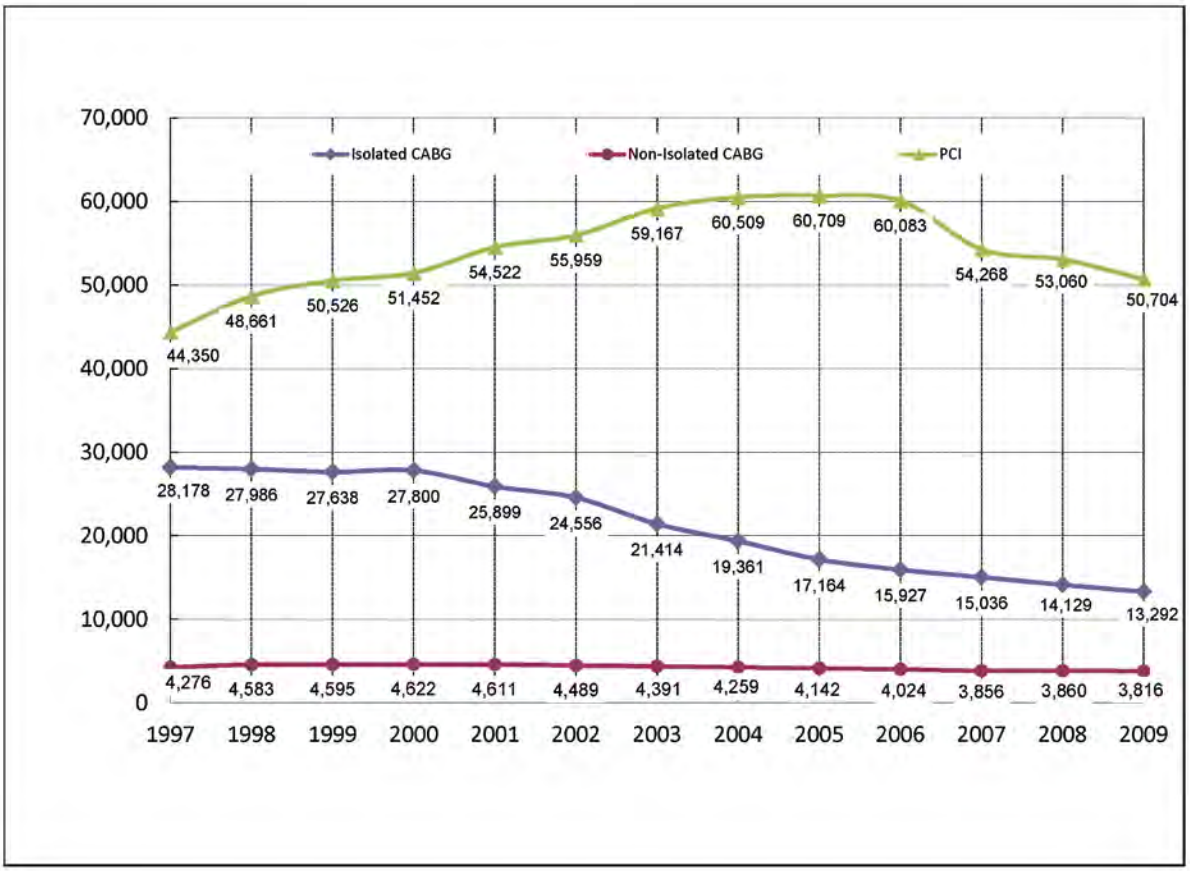
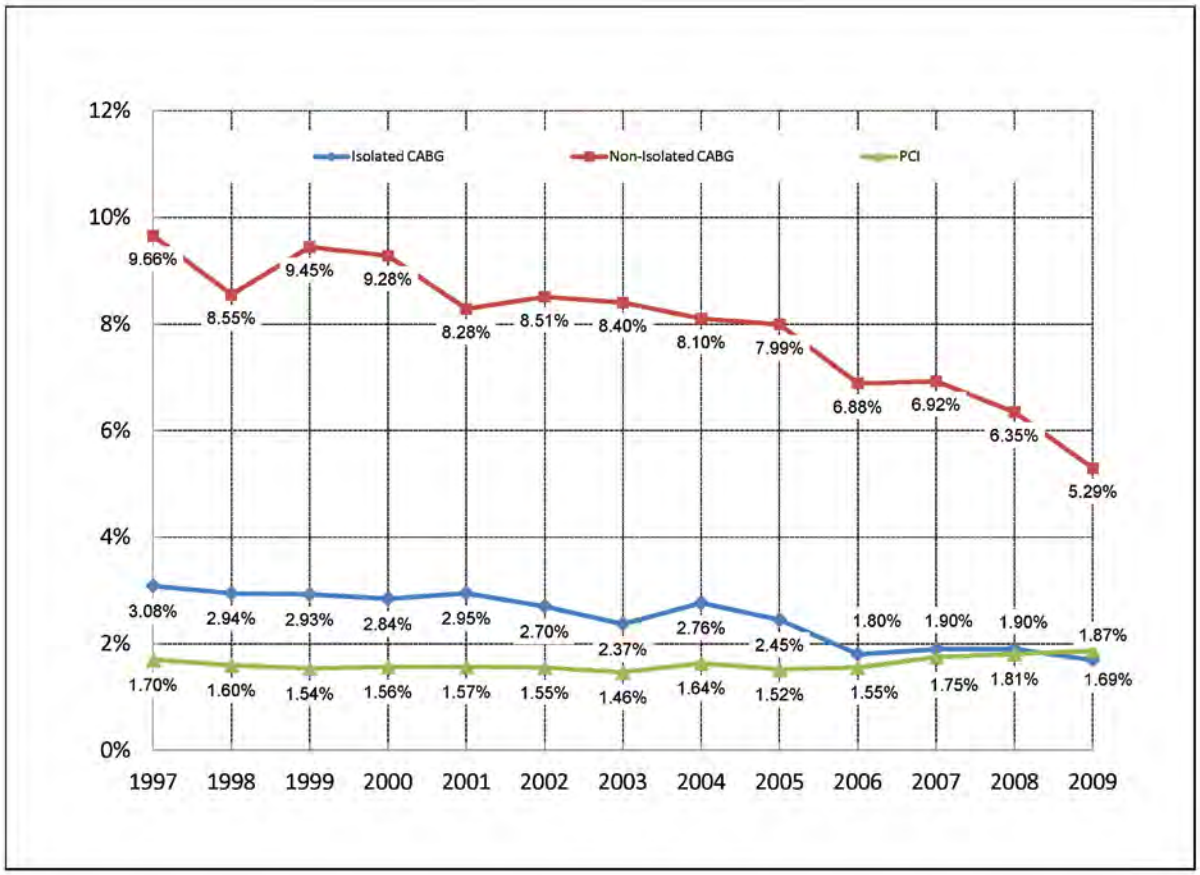


Figure 2: In-Hospital Mortality Rates for Isolated CABG, Non-Isolated CABG, and PCI Procedure in California, 1997-2009



APPENDIX A: HOSPITAL STATEMENTS

CCORP provided each hospital with a preliminary report containing the risk-adjusted models, explanatory materials, and results for all hospitals. Hospitals were given a 60-day review period to submit statements to OSHPD for inclusion in this report. Three hospitals submitted letters, which are included here.

California Pacific Medical Center

A Sutter Health Affiliate

Date: October 8, 2010
Re: Response from CPMC on CCORP 2007-2008 CABG Mortality Report

California Pacific Medical Center (CPMC) delivers care to many cardiac patients with complicated medical conditions. Many of our patients undergo combined procedures involving replacement of a cardiac valve as well CABG.

In January 2007, a new chief of cardiac surgery was recruited to revitalize the cardiac surgery program at California Pacific Medical Center. We put evidence-based protocols in place, provided educational and skills-based training for staff, and formed multidisciplinary committees to identify and resolve quality issues. We created a culture emphasizing safety and have continued to improve our overall cardiac surgical results substantially.

The result of our efforts has been remarkable. We have had 100% in-hospital and 30-day survival among patients who had isolated coronary artery bypass surgery (without valve replacement) at CPMC in 2009 and during the first 3 quarters of 2010. Improving our practice and achieving the high standards we represent today remains our mission.

Allan Pont, M.D.
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DESERT REGIONAL MEDICAL CENTER

October 7, 2010

Holly Hoegh, Ph.D.
Manager, Clinical Data Programs
Office of Statewide Health Planning and Development
400 R Street, Room 250
Sacramento, CA 95811
(916) 445-7534 Fax
hhoegh@oshpd.ca.gov

SUBJECT: Hospital Statements regarding the 2007-2008 CCORP Preliminary Report

Pursuant to your letter dated August 9, 2010, Desert Regional Medical Center provides the following statement.

While the total number of mortalities is correct it has been determined that the risk factors were being under reported. With the new reports available in OSHPD CORC system we have been able to determine that the following factors were being under reported:

- Chronic Lung Disease
- NYHA Classification
- Mitral Insufficiency
- Body Mass Index

In July 2009 a new form was put into use to ensure more accurate reporting and abstraction of risk factors. Additionally, the hospital has implemented a Cardiovascular Performance Improvement Committee to review the data in a timely fashion and make the necessary educational improvements when detected. Unfortunately, with the age of the information being disseminated our system revisions will not be seen for approximately two years.

Questions pertaining to this correspondence should be directed to the undersigned
At 760-323-6799 or sandra.martin@tenethealth.com

Sandra Martin
Director Clinical Quality Improvement
1150 N. Indian Canyon
Palm Springs, CA 92262

GOOD SAMARITAN HOSPITAL

October 6, 2010

Holly Hoegh, Ph.D.
Manager, Clinical Data Programs
Office of Statewide Health Planning and Development
400 R Street, Room 250
Sacramento, CA 95811

As consumers review comparisons of California hospital performance on Coronary Artery Bypass Grafts (CABG), we encourage the pubic to look at this report as a single thread in a complex fabric of quality reporting.

In this study, from 2008, there is a particularly broad spectrum for hospitals performing "as expected." While Good Samaritan Hospital's CABG mortality rate falls within the "as expected" range, our performance is better than the state average. Use of arteries from the chest wall (internal mammary) in selected patients is recognized as a best practice, and this study shows that Good Sam used this procedure in 100 per cent of cases where it was indicated.

Good Sam's approach to reporting performance in studies like this one is to report rigorously using the most detailed possible review of patient hospital records and interpretation of outcomes. This may mean that our strict interpretation disadvantages us in comparison with others who may use a more liberal interpretation.

We have done a case by case review of the surgeries contributing to the study's rating for us on the incidence of stroke following CABG. Following that review, we implemented a more aggressive strategy for management of atrial fibrillation, the most frequent cause of stroke following CABG, including earlier intervention with anti-coagulation therapy. We believe this strategy will be reflected in future years of the state's study, and that it will improve outcomes for patients.

This study is one of the many tools patients may use in making a choice about their healthcare. We recommend consumers also review information available through HospitalCompare, the Leapfrog Group and the Joint Commission. Above all else, patients should talk with their physicians about the experience, patient outcomes and clinical quality improvement programs at any specific hospital they are considering for their care.

Sincerely,

Arthur Douville, MD
Chief Medical Officer
Good Samaritan Hospital

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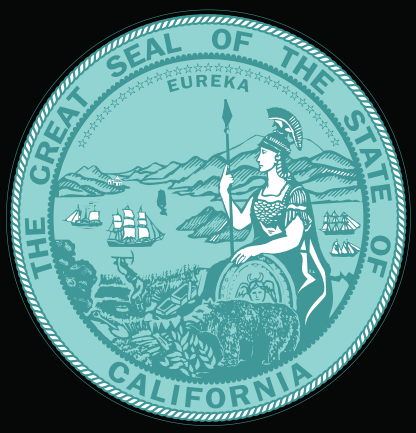

JUNE 2011

Additional copies of The California Report on Coronary Artery Bypass Graft Surgery
may be obtained by visiting www.oshpd.ca.gov