THE DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION

Technical Note

For

The California Report on Coronary Artery Bypass Graft Surgery 2024: Hospital Data

October 2026

Prepared by

Department of Health Care Access and Information

Suggested citation: State of California, Department of Health Care Access and Information. *The California Report on Coronary Artery Bypass Graft Surgery, 2024: Hospital Data*, Sacramento, CA: Department of Health Care Access and Information, October 2026. Copies of this document and other CABG surgery-related reports may be found at https://hcai.ca.gov/data/healthcare-quality/coronary-artery-bypass-graft-outcomes-reports/.

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Introduction

This technical note describes the research methods used to develop the California Cardiovascular Outcomes Reporting Program's (CCORP) report: *The California Report on Coronary Artery Bypass Graft (CABG) Surgery in California, 2024: Hospital Data*. This report is produced by Department of Health Care Access and Information (HCAI) in compliance with California Health and Safety Code Sections 128745-128750 and can be found at: HCAI CABG Reports.

See Appendix A for definitions of the technical terms used in this document.

Provider Performance Measures Reported

This report provides hospital performance data on five key measures of CABG surgery quality:

Outcome measures	*Process measure*
Isolated CABG operative mortality	Use of the internal mammary artery (IMA) (isolated CABG)
CABG + Valve operative mortality	
Post-operative stroke (isolated CABG)	
30-day hospital readmission (isolated CABG)	

All outcome measures are risk-adjusted to account for variation in the health status of patients prior to CABG surgery.

Measure Definitions:

Operative mortality includes all deaths occurring during the hospitalization (up to 90 days) in which the CABG surgery was performed; all deaths after transferring to another acute care center up to 90 days; and all deaths after discharge within 30 days after the surgery (no matter where they occurred). Use of operative mortality instead of in-hospital mortality avoids potential manipulation of outcomes through early discharge practices and holds hospitals accountable for patients who died at home or in other facilities shortly after discharge. The National Quality Forum (NQF), which serves as the national body for vetting quality measures, has endorsed the Society of Thoracic Surgeons' (STS) operative mortality measure for CABG surgery.[1] CCORP verifies deaths following patient discharge using death records from the California Department of Public Health (CDPH).

- *Isolated CABG surgery* is defined as CABG surgery performed on patients aged 18 years or older without other major procedures, such as valve repair or carotid endarterectomy, during the same surgery. For a detailed definition of isolated CABG surgery, please contact CCORP@hcai.ca.gov.

[1] National Quality Forum (NQF). National voluntary consensus standards for quality measurement, Washington, DC: National Quality Forum. In 2022, NQF updated its endorsement of the risk-adjusted operative mortality for isolated CABG measure by STS (#0119). Details can be found at NQF QPS.

- *CABG + Valve surgery* is defined as CABG surgery, performed on patients aged 18 years or older, that includes aortic valve replacement, mitral valve replacement or repair, or a combination thereof.

Post-operative stroke is defined as a post-operative, central neurologic deficit that did not resolve within 24 hours after surgery.

30-day hospital readmission includes unplanned readmission that arise from acute clinical events requiring urgent rehospitalization within 30 days of discharge date after isolated CABG surgery. All unplanned readmissions are counted as an outcome, regardless of cause. Starting 2018 data, California adopted all-cause unplanned readmission from Centers for Medicare & Medicaid Services (CMS). The method was based on CMS readmission outcome measure- "Hospital-level 30-day All-Cause Unplanned Readmission Following Coronary Artery Bypass Graft Surgery". The measure can be found at https://qualitynet.cms.gov.

Use of the internal mammary artery (IMA) is the preferred method for CABG surgery of the left anterior descending (LAD) artery. Research shows that IMA use results in better long-term graft patency and improved patient survival, compared with use of saphenous vein grafts.

Data Quality Review and Verification

Study Population

Under state law, California-licensed hospitals are required to report all isolated and non-isolated CABG surgeries to HCAI. The study populations for the measures vary by data year and exclusion criteria (Table 1).

Table 1: Study Populations Used in Measures (Denominator, Exclusion Criteria, and Year)

Measure	Study Population (Denominator)	Data Year(s)
Isolated CABG Operative Mortality	Total number of isolated CABG cases without salvage operative status	2024
CABG + Valve Operative Mortality	Total number of CABG cases without salvage operative status with aortic valve replacement, mitral valve repair or mitral valve replacement (or a combination)	2023−2024
Post-Operative Stroke	Total number of isolated CABG cases without salvage operative status	2023−2024
30-day Hospital Readmission	Total number of isolated CABG cases, where the patient was discharged alive from the CABG-performing hospital and could be followed via HCAI's hospital Patient Discharge Data (PDD) file. Patients in salvage operative status, patients who were transferred to acute care, and patients who left against medical advice were excluded.	2023−2024
Internal Mammary Artery Usage	First-time, non-cardiogenic shock, isolated CABG cases discharged where the operative status was elective or urgent and the LAD artery was bypassed.	2024

In 2023 and 2024, there were 31,662 adult CABG surgeries performed across 120 California hospitals (Table 2). Of these, 26,018 (82.2%) were isolated CABG surgeries and 5,644 (17.8%) were non-isolated CABG surgeries. The study population for two measures (hospital operative mortality and IMA use) in this report consists of all adult patients who underwent isolated CABG surgery and were discharged in 2024. To improve the statistical power for hospital CABG + Valve mortality, hospital isolated CABG post-operative stroke, and hospital isolated CABG 30-day readmissions, the study population includes those patients who were discharged in 2023 or 2024.

Table 2: California CABG Surgery Volume, 2023−2024

CABG Type	2023		2024		2023−2024 Combined	
	Cases	%	Cases	%	Cases	%
Isolated CABGs	13,056	82.1%	12,962	82.2%	26,018	82.2%
CABG + Valve	1,838	11.6%	1,750	11.1%	3,588	11.3%
Other CABGs	1,008	6.3%	1,048	6.7%	2,056	6.5%
All CABGs	15,902	100%	15,760	100%	31,662	100%

Data Sources and Data Quality Review

The clinical data used in this report is collected by CCORP's Cardiac Online Reporting for California (CORC) system which was developed to assist California hospitals with their state-mandated data submissions. CCORP aligns with most data elements from the STS Adult Cardiac Surgery Database. However, a few data elements are exclusive to CCORP. Although STS and CCORP data definitions are generally identical, CCORP provides additional clarifications to assist hospitals with coding. For a detailed definition of CABG surgery, please contact CCORP@hcai.ca.gov.

The CCORP 2023-2024 data (120 hospitals) was linked to HCAI's Patient Discharge Data (PDD) previously linked to CDPH death records to identify patients who died following CABG surgery and patients who were discharged alive and readmitted to a hospital within 30 days of discharge date after the CABG surgery.

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 Collection and Acceptance

Hospitals submit data using CORC, the on-line data registry. Automated data acceptance reports notify hospitals of invalid, missing, and abnormally high or low data values. Data quality reports are also generated each time a hospital submits

data. Hospitals review these summary reports before they adjust, finalize, and certify their data submission.

Step 2: Data Discrepancy Reports

HCAI generates data discrepancy reports, which compare the CCORP registry data with PDD data (the hospital administrative data record). 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 cases were reported; 2) each CABG case was accurately coded as isolated or non-isolated CABG surgery; 3) coding of *Discharge Status* was consistent; 4) when relevant, resuscitation occurred prior to CABG surgery; and 5) coding of post-operative complications (including strokes) was consistent.

Step 3: Risk-Factor Coding Reports

Risk-factor coding reports identify values that may be extreme by comparing the hospital-reported prevalence rates for risk factors for CABG cases in the current year to prior years and to the administrative data from the PDD. CCORP requests hospitals to review and, when necessary, correct miscoded data elements.

Hospital Medical Chart Audit

After completing the data quality review and verification process, CCORP developed a preliminary risk model for operative mortality and post-operative stroke to help identify candidate hospitals for a medical chart audit. Candidate selection for the 2024 audit was based on 1) results of the preliminary model that identified **"Better"** or **"Worse"** hospital performers, and 2) data quality reports that identified problems in hospitals that over- and under-reported patient-risk factors. Additionally, a small number of hospitals were randomly selected for audit.

The 2024 audit included 17 hospitals and a total of 1,230 patient records representing 14.4% of 118 hospitals and 7.5% of all CABG surgery cases in 2024. Remote or on-site medical chart reviews were conducted by trained, independent auditors under contract with HCAI. All hospital deaths and post-operative strokes at selected hospitals were audited and high-risk patients, based on predicted mortality, were sampled at a higher rate. The number of patient records selected within a hospital was proportional to the CABG volume at each hospital, ranging from 400 to 112 cases. If a selected hospital performed fewer than 40 isolated CABG surgeries per year, all surgeries were audited. Individual audit summary reports were sent to each hospital for review and comment.

Risk Model for Adjusting Hospital Isolated CABG Operative Mortality Rates, 2024

This section explains the development and validation of CCORP's risk model that accounts for the variation in patient severity-of-illness for hospital operative mortality. CCORP used a multivariable logistic regression model to estimate the relationship between the demographic and pre-operative risk factors and the probability of operative mortality.

To develop the risk model for hospital mortality rates, the 12,949 isolated (non-salvage) CABG surgery cases in 2024 were evaluated for missing values. Values for the missing data were imputed by replacing the missing data with the lowest-risk category of each variable (e.g., *Chronic Lung Disease* = *none*) to ensure that the effects of risk factors were estimated based on the most complete data available. As a result, 12,949 cases had no missing data in any field and were used for the risk model parameter estimation.

CCORP assigned the lowest risk value for the following reasons: 1) some hospitals leave data fields blank by design when the risk factor is absent or the value is normal; 2) maintains consistency with other major cardiac reporting programs that replace missing data with the lowest-risk or normal value; and 3) creates an incentive for more complete reporting by hospitals. Finally, the parameters of the risk model were applied to all cases to estimate each patient's probability of death. These probabilities were summed to estimate the expected mortality for each hospital. The hospital risk model (based on 2024 data) is presented in Appendix A-1 with statistically significant risk factors identified in bolded text.

Discrimination of Risk Model for Hospital Isolated CABG Operative Mortality

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 2024 risk model, the C-statistic was 0.836. In recently published CABG surgery mortality reports by other states (New Jersey, New York, and Pennsylvania), the C-statistics ranged from 0.777 to 0.830. Additionally, the Centers for Medicare and Medicaid Services reported that its 30-day all-cause CABG mortality risk model performance remained constant at 0.74 over a 12-month time period (2023-2024).[2]

Calibration of Risk Model for Hospital Isolated CABG Operative Mortality

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 2024 risk model is 0.217 indicating there were no significant differences between observed and predicted outcomes over deciles of risk and there were no systematic over- or under-estimations at the extreme deciles of risk.

A second calibration test sorts the data into 10 risk groups and compares observed deaths with predicted deaths in each of 10 risk groups. As presented in Table 3, Risk Group 10 shows the patients in the highest risk group. Among the 1,289 patients in

[2] *2025 Procedure-Specific Measure Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Mortality Measure Isolated Coronary Artery Bypass Graft (CABG) Surgery – Version 12.0*. Centers for Medicare and Medicaid Services. QualityNet. April 2025.

Group 10, 142 patients died, and the model predicted 146.6 patient deaths. Assuming a Poisson distribution for a binary outcome, the predicted range of deaths for Risk Group 10 is 123.9 to 172.4. The observed number of 142 deaths falls within the range of predicted readmissions. None of the risk groups showed observed deaths outside the 95% confidence interval (CI) for predicted deaths.

Table 3: Calibration of Risk Model for Hospital Isolated CABG Operative Mortality, 2024

Risk Group	Isolated CABG Cases	Observed Deaths	Predicted Deaths	Difference	95% CI of Predicted Deaths	
1	1,296	2	2.3	0.3	0.4	7.8
2	1,297	2	4.3	2.3	1.2	10.6
3	1,296	7	6.0	-1.0	2.2	13.1
4	1,296	3	8.1	5.1	3.5	15.9
5	1,295	8	10.7	2.7	5.3	19.3
6	1,295	14	14.3	0.3	7.9	23.9
7	1,295	16	19.6	3.6	11.9	30.4
8	1,295	37	28.5	-8.5	19.0	41.0
9	1,295	57	47.5	-9.5	35.0	63.1
10	1,289	142	146.6	4.6	123.9	172.4

Note: Risk Group 1 is the lowest risk for mortality and Risk Group 10 is the highest risk.

Process for Calculating Hospital Risk-Adjusted Mortality Rates and Performance Rating

The risk-adjusted mortality rate (RAMR) is computed by dividing the provider's observed mortality by the provider's expected mortality (obtained from the risk model calculation) to get the observed/expected (O/E) ratio. The O/E ratio is then multiplied by the statewide mortality rate (2.22% in 2024 for hospitals) to obtain the provider's risk-adjusted mortality rate.

However, because a provider's point estimate of the RAMR can be attributed (in part) to chance, the performance rating is not based on a point estimate of the RAMR, but a comparison of the 95% CI of each provider's RAMR to the statewide mortality rate.[3] CCORP treated the 2024 data as a sample, and inferred a range within which each provider's true performance was likely to fall.

As shown in Appendix A-2, a provider's performance rating is **"Better"** if the upper 95% CI of its risk-adjusted mortality rate is below the state average mortality rate (indicating the provider's RAMR is significantly lower than the state average). A provider's performance rating is **"Worse"** if the lower 95% CI of its RAMR is above the state average mortality rate (indicating the provider's risk-adjusted mortality is significantly higher than the state average). If the state average mortality rate is within the 95% CI of a provider's RAMR, then the performance rating is **"Average."**

[3] CCORP uses the Poisson Exact Probability method to compute the 95% confidence interval for the risk-adjusted mortality rate. (Buchan Iain, *Calculating Poisson Confidence Interval in Excel*, January 2004).

Hospital Risk-Adjusted Operative Mortality Results for Isolated CABG, 2024

Appendix A-2 presents the risk-adjusted isolated CABG operative mortality results for each hospital for 2024. The table is sorted by geographic region and contains, for each hospital, the total number of CABG surgeries performed (isolated and non-isolated combined), number of isolated CABG surgeries (excluding salvage cases), number of observed isolated CABG deaths, observed isolated CABG mortality rate, expected isolated CABG mortality rate predicted by the risk model, RAMR and 95% CI of the RAMR, and the associated hospital performance rating.

Among the 12,949 isolated and non-salvage CABG surgeries performed at 118 hospitals in 2024, 288 patients died either in-hospital (up to 90 days, including transfers to other acute care hospitals) or after discharge, but within 30 days of the surgery date, reflecting a statewide hospital operative mortality rate of 2.22%. The *observed* mortality rates among hospitals ranged from 0% to 14.29%. The *expected* mortality rates, which are generated by the risk model and account for patient severity-of-illness, were between 1.23% and 5.64%. The RAMRs, which reflect hospital performance, ranged from 0% to 9.89%.

Based on the 95% CIs for the RAMRs, 113 of 118 hospitals (95.8%) performed within the expected range when compared to the statewide mortality rate. One hospital was rated **"Better"** than the state average operative mortality rate (Loma Linda University Medical Center) and four hospitals were rated **"Worse"** than the state average (Adventist Health Bakersfield, Bakersfield Memorial Hospital, Providence St. Joseph Hospital, and St. Joseph's Medical Center of Stockton) (Appendix A-2).

Risk Model for Adjusting Hospital CABG + Valve Operative Mortality Rates, 2023−2024

Performance ratings for CABG + Valve surgery are based on operations occurring in 2023 or 2024 that combined CABG and aortic valve replacement, mitral valve repair, and/or mitral valve replacement procedures. These exclude patients in salvage operative status.

To develop the risk model for hospital CABG + Valve operative mortality, the 3,573 CABG + Valve cases in 2023−2024 were evaluated for missing data. Values for the missing data were imputed by replacing them with the lowest risk category of the same variable (e.g., *Chronic Lung Disease = none*) to ensure that the effects of risk factors were estimated based on the most complete data available. As a result, 3,573 cases had no missing data in any field and were used for the risk model parameter estimation. The risk model, based on the 2023−2024 data, is presented in Appendix B-1 with statistically significant risk factors identified in bolded text.

Discrimination of Risk Model for Hospital CABG + Valve Operative Mortality

Discrimination methods are explained in the section for hospital isolated CABG operative mortality. For this 2023-2024 risk model, the C-statistic was 0.796. The STS 2018 cardiac surgery risk model[4] reported the CABG + Valve surgery mortality C-statistic was 0.761.

Calibration of Risk Model for Hospital CABG + Valve Operative Mortality

Calibration methods are explained in the section for hospital isolated CABG operative mortality. The p-value of the Hosmer-Lemeshow test statistic for this 2023-2024 risk model was 0.367, indicating there were no significant differences between observed and predicted outcomes over deciles of risk and there were no systematic over- or under-estimations at the extreme deciles of risk.

A second calibration test sorts the data into 10 risk groups and compares observed deaths with predicted deaths (Table 4). Among the 357 patients in Group 5, the model predicted 8.6 patient deaths, while 11 patients deaths were observed. Assuming a Poisson distribution for a binary outcome, the predicted range of deaths for Risk Group 5 was 3.8 to 16.5. The observed number of 11 deaths falls within the range of predicted deaths. None of the risk groups showed observed deaths outside the 95% CI for predicted deaths.

Table 4: Calibration of Risk Model for Hospital CABG + Valve Operative Mortality, 2023-2024

Risk Group	CABG + Valve Cases	Observed Deaths	Predicted Deaths	Difference	95%CI of Predicted Deaths	
1	357	1	2.7	1.7	0.5	8.3
2	357	3	4.1	1.1	1.2	10.4
3	357	3	5.3	2.3	1.8	12.2
4	357	4	6.8	2.8	2.7	14.1
5	357	11	8.6	-2.4	3.8	16.5
6	357	11	10.9	-0.1	5.4	19.6
7	357	15	14.3	-0.7	7.9	23.9
8	357	25	19.6	-5.4	11.9	30.4
9	357	36	29.0	-7.0	19.4	41.7
10	360	65	72.7	7.7	56.9	91.4

Note: Risk Group 1 is the lowest risk for mortality and Risk Group 10 is the highest risk.

[4] O'Brien SM, Feng, L, He X, et al. The Society of Thoracic Surgeons 2018 cardiac surgery risk models: part 2—Statistical Methods and Results. Annals of Thoracic Surgery. 2018; 105:1419–28.

Process for Calculating Hospital Risk-Adjusted CABG + Valve Operative Mortality Rates and Performance Rating

The RAMR is computed by dividing the provider's observed mortality by the provider's expected mortality (based on the risk model) to get the observed/expected (O/E) ratio. The O/E ratio is then multiplied by the statewide average mortality rate (4.87% in 2023−2024) to obtain the provider's RAMR.

However, because a provider's point estimate of the RAMR can be attributed (in part) to chance, the performance rating is not based on the point estimate of the RAMR, but on a comparison of the 95% CI of each provider's RAMR to the statewide mortality rate.[5] CCORP treated the 2023−2024 data as a sample, and inferred a range within which each provider's true performance was likely to fall. As shown in Appendix B-2, a provider's performance rating is **"Better"** if the upper 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). A provider's performance rating is **"Worse"** if the lower 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). If the state average mortality rate is within the 95% CI of a provider's RAMR, then the performance rating is **"Average."**

Hospital Risk-Adjusted CABG + Valve Operative Mortality Results, 2023−2024

Appendix B-2 presents the risk-adjusted CABG + Valve operative mortality results for each hospital for 2023−2024. The table is sorted by geographic region and contains, for each hospital, the total number of CABG surgeries performed (isolated and non-isolated combined), number of CABG + Valve surgeries (excluding salvage cases), number of observed CABG + Valve operative deaths, observed CABG + Valve mortality rate, expected CABG + Valve mortality rate predicted by the risk model, RAMR and 95% CI of the RAMR, and the associated hospital performance rating.

Among the 3,573 CABG + Valve, non-salvage surgeries performed at 114 hospitals in 2023−2024, 174 patients died either in-hospital (up to 90 days) or after discharge but within 30 days of the surgery date, reflecting a statewide operative mortality rate of 4.87%, which was lower than the rate from 2022-2023 (5.35%). The *observed* mortality rates among hospitals ranged from 0.00% to 33.33%. The *expected* mortality rates, which are generated by the risk model and account for patient severity-of-illness, were between 1.33% and 19.56%. The RAMR, which reflects hospital performance, ranged from 0.00% to 37.63%.

Based on the 95% CIs for the RAMRs, 113 of 114 hospitals (99.1%) performed within the expected range when compared to the statewide mortality rate. One hospital was

[5] CCORP uses the Poisson Exact Probability method to compute the 95% confidence interval for the risk-adjusted mortality rate (Buchan Iain, Calculating Poisson Confidence Interval in Excel, January 2004).

rated **"Better"** than the state average operative mortality rate (Kaiser Foundation Hospital - Santa Clara), and no hospital was rated **"Worse"** than the state average rate (Appendix B-2).

Risk Model for Adjusting Hospital Post-Operative Stroke Rates, 2023−2024

Post-operative stroke is a relatively rare, but serious, complication that can occur after CABG surgery. To assess hospital performance, CCORP combined 2023 and 2024 data to increase the number of cases and reliability of hospital results. Similar to the methodology used to assess the operative mortality rate, CCORP used a multivariable logistic regression model to estimate the relationship between each of the demographic and pre-operative risk factors and the probability of post-operative stroke. The risk model, based on the 2023−2024 data, is presented in Appendix C-1 with statistically significant risk factors identified in bolded text.

Discrimination of Risk Model for Hospital Post-Operative Stroke

Discrimination methods are explained in the section for hospital isolated CABG operative mortality. For the 2023−2024 risk model, the C-statistic was 0.708. This risk model compares favorably with an earlier STS post-operative stroke model (C-statistic = 0.697 for isolated CABG surgery).[4]

Calibration of Risk Model for Hospital Post-Operative Stroke

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 0.485, indicating there were no significant differences between observed and predicted outcomes over deciles of risk and there were no systematic over- or under-estimations at the extreme deciles of risk.

A second calibration test sorts the data and compares observed stroke cases with predicted stroke cases in each of 10 risk groups. As presented in Table 5, Risk Group 7 shows patients in a mid-level risk group. Among the 2,600 patients in this group, 28 patients had post-operative strokes, but the model predicted 33.3 cases. Assuming a Poisson distribution for a binary outcome, the predicted range of strokes for this group is 23.70 to 46.7. The observed number of 28 strokes falls within the 95% CI for predicted strokes.

Table 5: Calibration of Risk Model for Hospital Post-Operative Stroke, 2023−2024

Risk Group	Isolated CABG Cases	Observed Post-Op Strokes	Predicted Post-Op Strokes	Difference	95% CI of Predicted Post-Op Stroke	
1	2,621	10	10.0	0.0	4.8	18.4
2	2,582	13	13.5	0.5	7.3	22.9
3	2,605	16	16.5	0.5	9.5	26.6
4	2,596	15	19.5	4.5	11.9	30.3
5	2,584	22	23.0	1.0	14.6	34.5
6	2,595	29	27.5	-1.5	18.2	39.8
7	2,600	28	33.3	5.3	23.0	46.7
8	2,599	44	41.6	-2.4	30.0	56.4
9	2,599	72	56.1	-15.9	42.4	72.8
10	2,611	98	106.0	8.0	86.8	128.2

Note: Risk Group 1 is the lowest risk and Risk Group 10 is the highest risk.

Process for Calculating Hospital Risk-Adjusted Post-Operative Stroke Rate and Performance Ratings

The risk-adjusted post-operative stroke rate (RASR) is computed by dividing the provider's observed 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. The O/E ratio is multiplied by the statewide post-operative stroke rate (1.34% for 2023−2024) to obtain the provider's RASR.

The performance rating is based on a comparison of the 95% CI of each provider's RASR to the statewide post-operative stroke rate. Thus, CCORP treated 2023−2024 data as a sample, and inferred the range in which each provider's true performance was likely to fall. As shown in Appendix C-2, if the upper 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 lower 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 **"Average."**

Hospital Risk-Adjusted Post-Operative Stroke Results, 2023−2024

Appendix C-2 presents the risk-adjusted post-operative stroke results for each hospital for 2023−2024. The table is sorted by geographic region and contains, for each hospital, the 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 25,992 isolated CABG surgeries performed in 2023 and 2024, 347 patients had a post-operative stroke in-hospital, reflecting an overall statewide rate of 1.34%. Among the 347 patients with post-operative stroke, 52 (14.99%) died either in-hospital (up to 90 days, including transfers to other acute care hospitals) or after discharge, but within 30 days of the surgery date. The observed stroke rate among hospitals ranged from 0.00% to 6.57%. The expected stroke rates, which are generated by the model and measure patient severity of illness, were between 0.76% and 2.74%. The RASR ranged from 0.00% to 7.36%.

Based on the 95% CIs for the RASR, 113 of 120 hospitals (94.2%) performed within the expected range when compared to the state average stroke rate. One hospital was rated **"Better"** than the state average post-operative stroke rate (Hoag Memorial Hospital Presbyterian) and six hospitals were rated **"Worse"** than the state average post-operative stroke rate (Bakersfield Memorial Hospital, Good Samaritan Hospital - San Jose, Memorialcare Saddleback Medical Center, Providence Cedars-Sinai Tarzana Medical Center, Torrance Memorial Medical Center, and USC Arcadia Hospital) (Appendix C-2).

Risk Model for Adjusting Hospital 30-Day Readmission Rates, 2023−2024

Readmissions account for a significant percentage of hospital healthcare costs. With better care and discharge planning, hospitals might avoid unnecessary readmissions. To assess hospital performance on this outcome, CCORP limited the analysis to isolated CABG surgery patients at risk for readmission to any acute care hospital within 30 days of being discharged to home or a non-acute care setting (see study population noted on page 2). Patients in salvage operative status, patients who were transferred to acute care, and patients who left against medical advice were excluded. Starting 2017−2018 data, CCORP adopted the CMS's 30-day all-cause unplanned readmission methodology. The detail about the readmission methodology can be found at "Hospital-level 30-day All-Cause Unplanned Readmission Following Coronary Artery Bypass Graft Surgery" published by CMS.

Similar to the methodology used to assess the operative mortality and post-operative stroke rates, CCORP used a multivariable logistic regression model to estimate the relationship between each of the demographic and pre-operative risk factors and the probability of a readmission within 30 days. The risk model, based on the 2023−2024 data, is presented in Appendix D-1 with statistically significant risk factors identified in bolded text.

Discrimination of Risk Model for Hospital 30-Day Readmission

Discrimination methods are explained in the section for hospital isolated CABG operative mortality. For the 2023−2024 risk model, the C-statistic was 0.662 which is

higher than the CMS risk model C-statistic of 0.64 for hospital 30-day readmission following CABG surgery using data from 2023 to 2024.[6]

Calibration of Risk Model for Hospital 30-Day Readmission

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 2023−2024 risk model is 0.152, indicating there were no significant differences between observed and predicted outcomes over deciles of risk and there were no systematic over- or under-estimations at the extreme deciles of risk. Another way to test model calibration is to partition the data and compare observed readmissions with predicted readmissions in each of 10 risk groups. As presented in Table 6, Risk Group 3 shows the patients in the lowest risk group. Among the 2,099 patients in this group, 127 patients were readmitted to the hospital, but the model predicted 141.4 readmissions. Assuming a Poisson distribution for a binary outcome, the predicted range of readmissions for Risk Group 3 is 119.1 to 166.7. The observed number of 127 readmissions falls inside the range of predicted readmissions.

Table 6: Calibration of Risk Model for Hospital 30-Day Readmission, 2023−2024

Risk Group	Isolated CABG cases	Observed 30-Day Readmission	Predicted 30-Day Readmission	Difference	95% CI of predicted 30-Day Readmission	
1	2,099	98	99.1	1.1	80.5	120.6
2	2,099	108	123.4	15.4	102.6	147.1
3	2,099	127	141.4	14.4	119.1	166.7
4	2,100	173	160.0	-13.0	136.2	186.8
5	2,100	211	180.8	-30.2	155.4	209.1
6	2,099	196	204.4	8.4	177.4	234.5
7	2,099	244	233.7	-10.3	204.7	265.7
8	2,099	265	274.2	9.2	242.7	308.6
9	2,099	334	344.3	10.3	308.9	382.6
10	2,099	549	543.8	-5.2	499.1	591.5

Note: Risk Group 1 is the lowest risk and Risk Group 10 is the highest risk.

Process for Calculating Hospital Risk-Adjusted 30-Day Readmission Rate and Performance Ratings

The risk-adjusted 30-day readmission rate (RARR) is computed by dividing the provider's observed readmission rate by the provider's expected readmission rate (obtained from the risk model calculation) to get the observed/expected (O/E) ratio.

[6] 2025 Procedure-Specific Readmission Measures Updates and Specifications Report Isolated Coronary Artery Bypass Graft (CABG) Surgery – Version 12.0 Elective Primary Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA) – Version 13.0. Centers for Medicare and Medicaid Services. April 2025.

The O/E ratio is then multiplied by the statewide readmission rate (10.98% for 2023−2024) to obtain the provider's RARR. However, because a provider's point estimate of the RARR can be attributed (in part) to chance, the performance rating is not based on a point estimate of the RARR, but on a comparison of the 95% CI of each provider's RARR to the California average readmission rate.[7] CCORP treated the 2023−2024 data as samples, and inferred a range within which each provider's true performance was likely to fall. As shown in Appendix D-2, if the upper 95% CI of a provider's RARR is below the state average readmission rate, indicating the provider's RARR is significantly lower than the state average, the performance rating is **"Better."** If the lower 95% CI of a provider's RARR is above the state average readmission rate, indicating the provider's RARR is significantly higher than the state average, the performance rating is **"Worse."** If the state average readmission rate is within the 95% CI of a provider's RARR, the performance rating is **"Average."**

Hospital Risk-Adjusted 30-Day Readmission Results, 2023−2024

Appendix D-2 presents the risk-adjusted readmission results for each hospital for 2023−2024. The table is sorted by geographic region and contains, for each hospital, the total number of CABG surgeries performed (isolated and non-isolated combined), number of patients discharged alive after isolated CABG surgeries (excluding salvage patients), number of observed isolated CABG readmissions, observed readmission rate, expected readmission rate predicted by the risk model, RARR and 95% CI of the RARR, and the associated hospital performance rating.

Among the 20,992 patients discharged alive following isolated (non-salvage) CABG surgeries in 2023−2024, 2,305 patients were readmitted to the same or another acute care hospital within 30 days of the surgery date, reflecting a statewide readmission rate of 10.98%. The observed readmission rates among hospitals ranged from 2.86% to 50.00%. The expected readmission rates, which are generated by the risk model and account for patient severity of illness, ranged between 8.26% and 15.82%. The RARR, which reflects hospital performance, ranged from 3.67% to 34.70%.

Based on the 95% CIs for RARRs, 101 of 119 hospitals (84.9%) performed within the expected range compared to the statewide readmission rate. Nine hospitals were rated **"Better"** than the state average readmission rate (Hoag Memorial Hospital Presbyterian, John Muir Medical Center - Concord Campus, Kaiser Foundation Hospital - Fontana, Kaiser Foundation Hospital - Los Angeles, Kaiser Foundation Hospital - San Francisco, Kaiser Foundation Hospital - Santa Clara, Mercy General Hospital, Stanford Health Care, and UC San Diego Health La Jolla - Jacobs Medical Center & Sulpizio Cardiovascular Center), and nine hospitals were rated **"Worse"** than the state average readmission rate (Centinela Hospital Medical Center, Community Regional Medical Center - Fresno, Doctors Medical Center, Garfield Medical Center, Los Robles Hospital and Medical Center, Northridge Hospital Medical Center, Scripps Memorial Hospital - La

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

Jolla, St. Mary Medical Center - Long Beach, and Torrance Memorial Medical Center) (Appendix D-2).

Hospital Internal Mammary Artery Usage Results, 2024

A widely accepted definition of healthcare quality contains three dimensions: process, structure, and outcomes.[8] In addition to publishing hospital outcomes, this report also assesses a process of care measure by reporting hospital use of the IMA in surgery. Although outcomes measurement permits comparison of provider performance and can be used within health care organizations for investigating processes and structures, assessing the process of care provides a more immediate path to improved care since it measures a specific step in patient care. If diagnostic and therapeutic strategies with clear links to outcomes are monitored, some healthcare quality problems can be detected and ameliorated long before demonstrable health outcomes 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 mammary artery). Clinical literature strongly supports use of the IMA to promote long-term graft patency (durability) and patient survival. Research also suggests a reduction in immediate operative mortality associated with use of the IMA rather than saphenous (leg) vein revascularization.[9] The IMA, and especially the left IMA, is considered the preferred conduit for revascularizing the left anterior descending (LAD) coronary artery.

Many nationally respected organizations encourage the use of IMA when appropriate. The Leapfrog Evidence-Based Hospital Referral program endorses the goal of 80% hospital adherence to IMA use. The National Quality Forum does not endorse a specific rate but states that the goal is to raise the IMA usage rates of hospitals with low utilization. The 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.

Appendix E presents hospital results by region for usage of the IMA during 2024. Only first-time, non-cardiogenic shock isolated CABG surgeries where the operative status is elective or urgent and the LAD was bypassed are included in calculating IMA usage rates. There is no consensus on an optimal usage rate, so performance ratings are not given. The IMA average usage rate for all hospitals was 99.3 percent in 2024, 99.3 percent in 2023, and 89.6 percent in 2003.

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

[9] 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.

Definitions of IMA Terms (see Appendix E)

Isolated CABG Surgeries: Includes only first-time, non-cardiogenic shock, isolated CABG surgeries for 2024 where the operative status was elective or urgent and the LAD artery was bypassed. This number is usually smaller than the total isolated CABG cases performed by the hospital.

IMA Usage Rate: The ratio of the number of CABG surgeries with IMA grafts (including left IMA, right IMA, and bilateral IMA) and selected first-time isolated CABG cases multiplied by 100: Percent IMA Use = Number of IMA Grafts used for First-Time Isolated CABG Surgeries/Number of First-Time Isolated CABG Cases × 100.

Appendix A-1: Logistic Regression Risk Model for Isolated CABG Operative Mortality, 2024

Risk Factor		Coefficient	Odds Ratio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Intercept		-11.60				<.0001
Age (Years)		**0.05**	**1.05**	**1.04**	**1.07**	**<.0001**
Gender	Male	Reference				
	Female	**0.33**	**1.39**	**1.06**	**1.84**	**0.0196**
Race	White	Reference				
	Asian	-0.23	0.79	0.53	1.18	0.2564
	Black	-0.12	0.89	0.48	1.64	0.7064
	Hispanic	0.15	1.16	0.86	1.57	0.3214
	Native American	0.57	1.76	0.41	7.62	0.4476
	Pacific Islander	0.35	1.42	0.55	3.71	0.4726
Body Mass Index	Normal 18.5 - < 30.0	Reference				
	< 18.5	**0.99**	**2.70**	**1.09**	**6.64**	**0.0312**
	30.0 - 40.0	0.26	1.30	0.99	1.71	0.0615
	> 40.0	**0.77**	**2.15**	**1.23**	**3.77**	**0.0074**
Status of Procedure	Elective	Reference				
	Urgent	**0.55**	**1.73**	**1.21**	**2.47**	**0.0028**
	Emergent	**1.08**	**2.96**	**1.46**	**6.01**	**0.0027**
Hypertension	No	Reference				
	Yes	0.40	1.49	0.84	2.65	0.1730
Cerebrovascular Disease	No	Reference				
	Yes	0.24	1.27	0.97	1.67	0.0863
Pneumonia	No	Reference				
	Yes	0.22	1.25	0.78	2.00	0.3568
Chronic Lung Disease	None/Mild/Moderate	Reference				
	Severe	**0.42**	**1.53**	**1.07**	**2.19**	**0.0208**
Myocardial Infarction (MI)	No MI	Reference				
	< 24 hours	0.58	1.79	0.88	3.64	0.1069
	1 - 7 days ago	**0.38**	**1.46**	**1.10**	**1.93**	**0.0093**
Heart Failure	No	Reference				
	Yes	0.24	1.28	0.95	1.72	0.1084
Ejection Fraction (EF)	EF >=50%	Reference				
	EF less than 20%	**1.41**	**4.11**	**1.82**	**9.24**	**0.0006**
	EF 20- <30%	**0.84**	**2.31**	**1.46**	**3.66**	**0.0004**
	EF 30- <40%	0.31	1.37	0.92	2.03	0.1196
	EF 40- <50%	**0.42**	**1.53**	**1.09**	**2.15**	**0.0152**
Cardiogenic Shock	No	Reference				
	Yes	**0.96**	**2.62**	**1.44**	**4.76**	**0.0016**

Appendix A-1: Logistic Regression Risk Model for Isolated CABG Operative Mortality, 2024

Risk Factor		Coefficient	Odds Ratio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Arrhythmia	No	Reference				
	Yes	**0.71**	**2.04**	**1.55**	**2.67**	**<.0001**
Mitral Insufficiency	None, Trival, Mild	Reference				
	Moderate/Severe	0.09	1.09	0.77	1.55	0.6128
Left Main Disease	No	Reference				
	Yes	0.11	1.11	0.86	1.44	0.4159
Number of Diseased Coronary Vessels	None, One, or Two	Reference				
	3 or more	0.21	1.23	0.90	1.69	0.1963
Diabetes	No Diabetes	Reference				
	Non-Insulin	0.11	1.12	0.83	1.51	0.4654
	Insulin	0.32	1.38	0.98	1.93	0.0620
Liver Disease	No	Reference				
	Yes	**1.11**	**3.03**	**1.91**	**4.80**	**<.0001**
Creatinine		**1.42**	**4.13**	**3.07**	**5.54**	**<.0001**
Peripheral Arterial Disease	No	Reference				
	Yes	**0.48**	**1.61**	**1.18**	**2.20**	**0.0029**
immunocompromise	No	Reference				
	Yes	0.39	1.48	0.85	2.58	0.1632
Prior Cardiac Surgery	First	Reference				
	Second or more	0.67	1.95	0.65	5.81	0.2318
Previous PCI	No PCI or > 6 hours	Reference				
	<= 6 hours	**1.15**	**3.15**	**1.26**	**7.91**	**0.0145**
Dual Payer Status	No	Reference				
	Yes	**0.35**	**1.43**	**1.06**	**1.92**	**0.0186**

Bolded text indicates statistically significant (p≤0.05).

C Statistic =0.836

Hosmer-Lemeshow test: p-value=0.217

Appendix A-2: Hospital Risk-Adjusted Isolated CABG Operative Mortality Results by Region, 2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
State		**15,752**	**12,949**	**288**	**2.22**					
Sacramento Valley & Northern California Region	Adventist Health and Rideout	65	52	4	7.69	3.30	5.18	1.41	13.27	Average
	Enloe Medical Center - Esplanade	97	73	2	2.74	2.93	2.08	0.25	7.52	Average
	Mercy General Hospital	712	523	6	1.15	1.98	1.29	0.47	2.80	Average
	Mercy Medical Center - Redding	79	63	0	0.00	3.30	0.00	0.00	3.95	Average
	Mercy San Juan Medical Center	99	82	1	1.22	1.58	1.72	0.04	9.56	Average
	Providence St. Joseph Hospital - Eureka	20	15	0	0.00	2.23	0.00	0.00	24.57	Average
	Shasta Regional Medical Center	113	82	1	1.22	2.76	0.98	0.02	5.47	Average
	Sutter Medical Center - Sacramento	534	415	9	2.17	2.11	2.28	1.04	4.33	Average
	UC Davis Medical Center	97	84	4	4.76	1.81	5.85	1.59	14.97	Average
San Francisco Bay Area & San Jose	AHMC Seton Medical Center	19	19	0	0.00	1.71	0.00	0.00	25.31	Average
	Adventist Health St. Helena	113	76	3	3.95	2.61	3.37	0.69	9.85	Average
	Alta Bates Summit Medical Center	151	129	5	3.88	3.02	2.86	0.93	6.67	Average
	California Pacific Medical Center - Van Ness Campus	85	66	2	3.03	2.10	3.20	0.39	11.57	Average
	Community Hospital of the Monterey Peninsula	69	49	2	4.08	1.86	4.89	0.59	17.68	Average
	Dominican Hospital	54	36	2	5.56	4.29	2.88	0.35	10.42	Average
	El Camino Hospital	109	94	3	3.19	2.02	3.52	0.73	10.29	Average
	Good Samaritan Hospital - San Jose	113	86	2	2.33	1.96	2.63	0.32	9.51	Average
	John Muir Medical Center - Concord Campus	249	202	4	1.98	2.91	1.51	0.41	3.88	Average
	Kaiser Foundation Hospital - San Francisco	656	584	4	0.68	1.27	1.20	0.33	3.08	Average
	Kaiser Foundation Hospital - Santa Clara	623	509	5	0.98	1.49	1.47	0.48	3.43	Average
	Marinhealth Medical Center	56	43	0	0.00	1.26	0.00	0.00	15.15	Average
	Mills-Peninsula Medical Center	63	53	0	0.00	2.43	0.00	0.00	6.38	Average
	North Bay Medical Center	59	51	3	5.88	1.38	9.49	1.96	27.72	Average
	O'Connor Hospital	45	40	1	2.50	1.95	2.85	0.07	15.90	Average
	Providence Queen of the Valley Medical Center	49	46	1	2.17	3.08	1.57	0.04	8.74	Average
	Providence Santa Rosa Memorial Hospital - Montgomery	91	65	0	0.00	2.73	0.00	0.00	4.62	Average
	Salinas Valley Health Medical Center	122	107	2	1.87	2.69	1.55	0.19	5.59	Average
	San Ramon Regional Medical Center	22	21	1	4.76	2.10	5.04	0.13	28.09	Average
	Santa Clara Valley Medical Center	79	58	1	1.72	1.74	2.20	0.06	12.25	Average
	Sequoia Hospital	82	52	2	3.85	3.01	2.84	0.34	10.27	Average
	Stanford Health Care	330	242	4	1.65	2.82	1.31	0.36	3.34	Average
	Stanford Health Care Tri-Valley	80	60	2	3.33	2.05	3.61	0.44	13.05	Average
	UC San Francisco Medical Center	106	91	1	1.10	2.31	1.06	0.03	5.90	Average
	Washington Hospital - Fremont	78	73	0	0.00	1.31	0.00	0.00	8.57	Average

Appendix A-2: Hospital Risk-Adjusted Isolated CABG Operative Mortality Results by Region, 2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
Central California	Adventist Health Bakersfield	99	93	7	7.53	2.19	7.66	3.08	15.77	**Worse**
	Bakersfield Heart Hospital	18	18	1	5.56	1.38	8.95	0.23	49.89	Average
	Bakersfield Memorial Hospital	74	69	5	7.25	1.63	9.89	3.21	23.09	**Worse**
	Clovis Community Medical Center	188	154	3	1.95	2.24	1.94	0.40	5.66	Average
	Community Regional Medical Center - Fresno	94	85	5	5.88	4.81	2.72	0.88	6.34	Average
	Dameron Hospital	61	52	2	3.85	2.36	3.62	0.44	13.09	Average
	Doctors Medical Center	234	211	4	1.90	2.10	2.01	0.55	5.14	Average
	Fresno Heart and Surgical Hospital	239	196	6	3.06	2.45	2.78	1.02	6.05	Average
	Kaweah Health Medical Center	180	156	2	1.28	3.40	0.84	0.10	3.03	Average
	Marian Regional Medical Center	101	93	1	1.08	1.70	1.41	0.04	7.86	Average
	Memorial Medical Center - Modesto	135	123	8	6.50	3.43	4.21	1.82	8.30	Average
	Saint Agnes Medical Center	178	146	9	6.16	3.34	4.11	1.88	7.80	Average
	St. Joseph's Medical Center of Stockton	214	195	14	7.18	3.44	4.64	2.54	7.79	**Worse**
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Adventist Health Glendale	85	75	1	1.33	1.32	2.24	0.06	12.51	Average
	Antelope Valley Hospital	46	41	1	2.44	2.30	2.36	0.06	13.12	Average
	Community Memorial Hospital - San Buenaventura	90	82	2	2.44	1.51	3.58	0.43	12.94	Average
	French Hospital Medical Center	91	72	2	2.78	1.87	3.30	0.40	11.91	Average
	Glendale Memorial Hospital and Health Center	57	52	0	0.00	1.49	0.00	0.00	10.58	Average
	Los Robles Hospital and Medical Center	86	69	2	2.90	1.80	3.58	0.43	12.95	Average
	Northridge Hospital Medical Center	89	79	4	5.06	1.81	6.21	1.69	15.90	Average
	Palmdale Regional Medical Center	6	5	0	0.00	2.62	0.00	0.00	62.66	Average
	Providence Cedars-Sinai Tarzana Medical Center	70	65	2	3.08	2.06	3.31	0.40	11.97	Average
	Providence Holy Cross Medical Center	66	60	2	3.33	2.53	2.93	0.35	10.57	Average
	Providence Saint Joseph Medical Center	38	34	1	2.94	1.84	3.56	0.09	19.86	Average
	Santa Barbara Cottage Hospital	104	86	2	2.33	2.87	1.80	0.22	6.52	Average
	St. John's Regional Medical Center	60	49	1	2.04	1.95	2.33	0.06	13.00	Average
	Valley Presbyterian Hospital	28	26	0	0.00	1.39	0.00	0.00	22.74	Average
	West Hills Hospital and Medical Center	42	40	0	0.00	1.87	0.00	0.00	10.96	Average

Appendix A-2: Hospital Risk-Adjusted Isolated CABG Operative Mortality Results by Region, 2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
Greater Los Angeles	Adventist Health White Memorial	27	25	1	4.00	2.64	3.37	0.09	18.79	Average
	California Hospital Medical Center - Los Angeles	70	63	2	3.17	1.97	3.58	0.43	12.92	Average
	Cedars Sinai Medical Center	270	213	2	0.94	1.69	1.23	0.15	4.45	Average
	Centinela Hospital Medical Center	57	53	5	9.43	3.75	5.59	1.82	13.05	Average
	Emanate Health Inter-Community Hospital	124	118	4	3.39	2.60	2.90	0.79	7.42	Average
	Garfield Medical Center	164	148	2	1.35	1.80	1.67	0.20	6.04	Average
	Henry Mayo Newhall Hospital	32	30	1	3.33	2.00	3.71	0.09	20.69	Average
	Hollywood Presbyterian Medical Center	29	28	1	3.57	3.14	2.53	0.06	14.10	Average
	Huntington Hospital	126	110	0	0.00	1.71	0.00	0.00	4.36	Average
	Kaiser Foundation Hospital - Los Angeles	773	651	9	1.38	1.91	1.61	0.74	3.06	Average
	Keck Hospital of USC	166	91	2	2.20	2.87	1.70	0.21	6.15	Average
	Lakewood Regional Medical Center	98	86	0	0.00	2.46	0.00	0.00	3.88	Average
	Los Angeles County + USC Medical Center	51	45	1	2.22	1.50	3.30	0.08	18.39	Average
	Los Angeles County/Harbor - UCLA Medical Center	65	51	0	0.00	1.23	0.00	0.00	13.10	Average
	Memorialcare Long Beach Medical Center	154	109	2	1.83	3.39	1.20	0.15	4.34	Average
	PIH Health Good Samaritan Hospital	71	58	0	0.00	1.89	0.00	0.00	7.47	Average
	PIH Health Hospital - Downey	27	26	0	0.00	4.33	0.00	0.00	7.28	Average
	PIH Health Hospital - Whittier	95	62	1	1.61	3.07	1.17	0.03	6.51	Average
	Providence Little Company of Mary Medical Center - Torrance	89	83	2	2.41	2.43	2.20	0.27	7.96	Average
	Providence St. John's Health Center	24	22	0	0.00	1.35	0.00	0.00	27.67	Average
	Ronald Reagan UCLA Medical Center	264	176	2	1.14	1.79	1.41	0.17	5.09	Average
	St. Francis Medical Center	21	21	3	14.29	4.74	6.70	1.38	19.59	Average
	St. Mary Medical Center - Long Beach	33	32	2	6.25	1.94	7.17	0.87	25.92	Average
	Torrance Memorial Medical Center	79	65	1	1.54	2.39	1.43	0.04	7.99	Average
	USC Arcadia Hospital	73	61	2	3.28	2.71	2.70	0.33	9.74	Average
Inland Empire, Riverside & San Bernardino	Arrowhead Regional Medical Center	38	31	0	0.00	3.00	0.00	0.00	8.82	Average
	Desert Regional Medical Center	67	57	2	3.51	2.16	3.61	0.44	13.05	Average
	Eisenhower Medical Center	130	113	4	3.54	2.80	2.81	0.77	7.20	Average
	Kaiser Foundation Hospital - Fontana	354	286	2	0.70	1.92	0.81	0.10	2.92	Average
	Loma Linda University Medical Center	270	207	0	0.00	2.64	0.00	0.00	1.50	**Better**
	Loma Linda University Medical Center - Murrieta	87	74	2	2.70	1.75	3.44	0.42	12.42	Average
	Pomona Valley Hospital Medical Center	135	126	6	4.76	3.10	3.42	1.25	7.44	Average
	Riverside Community Hospital	247	218	1	0.46	1.45	0.70	0.02	3.92	Average
	San Antonio Regional Hospital	167	144	3	2.08	1.53	3.04	0.63	8.88	Average
	St. Bernardine Medical Center	278	245	9	3.67	3.12	2.62	1.20	4.97	Average
	St. Mary Medical Center - Apple Valley	70	66	1	1.52	2.60	1.29	0.03	7.21	Average
	Temecula Valley Hospital	192	174	3	1.72	1.61	2.38	0.49	6.95	Average

Appendix A-2: Hospital Risk-Adjusted Isolated CABG Operative Mortality Results by Region, 2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
Orange County	AHMC Anaheim Regional Medical Center	126	102	2	1.96	1.65	2.64	0.32	9.54	Average
	Fountain Valley Regional Hospital and Medical Center - Euclid	105	104	1	0.96	2.42	0.88	0.02	4.92	Average
	Hoag Memorial Hospital Presbyterian	240	173	1	0.58	1.70	0.76	0.02	4.22	Average
	Memorialcare Orange Coast Medical Center	151	122	1	0.82	2.07	0.88	0.02	4.91	Average
	Memorialcare Saddleback Medical Center	68	62	0	0.00	2.14	0.00	0.00	6.19	Average
	Orange County Global Medical Center	59	55	2	3.64	1.96	4.12	0.50	14.87	Average
	Providence Mission Hospital	107	84	2	2.38	1.52	3.48	0.42	12.56	Average
	Providence St. Joseph Hospital	169	137	7	5.11	1.75	6.48	2.60	13.34	**Worse**
	Providence St. Jude Medical Center	130	105	1	0.95	1.50	1.41	0.04	7.87	Average
	UC Irvine Medical Center	155	113	6	5.31	3.79	3.11	1.14	6.77	Average
	West Anaheim Medical Center	31	31	4	12.90	5.64	5.09	1.39	13.02	Average
Greater San Diego	Grossmont Hospital	106	94	3	3.19	3.23	2.20	0.45	6.42	Average
	Palomar Medical Center	66	61	1	1.64	1.71	2.13	0.05	11.86	Average
	Scripps Memorial Hospital - La Jolla	460	366	3	0.82	1.88	0.97	0.20	2.83	Average
	Scripps Mercy Hospital	68	52	0	0.00	1.80	0.00	0.00	8.78	Average
	Sharp Chula Vista Medical Center	138	128	2	1.56	2.62	1.33	0.16	4.80	Average
	Sharp Memorial Hospital	137	82	2	2.44	2.07	2.63	0.32	9.49	Average
	Tri-City Medical Center	53	47	3	6.38	2.73	5.20	1.07	15.20	Average
	UC San Diego Health La Jolla - Jacobs Medical Center & Sulpizio Cardiovascular Center	274	196	5	2.55	2.83	2.00	0.65	4.68	Average

Appendix B-1: Logistic Regression Risk Model for CABG + Valve Operative Mortality, 2023-2024

Risk Factor		Coefficient	Odds Ratio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Intercept		-7.80				<.0001
Surgery Type	IsoAVRCAB	Reference				
	IsoMVRepairCAB	-0.38	0.68	0.33	1.41	0.3032
	IsoMVRCAB	**0.75**	**2.13**	**1.32**	**3.42**	**0.0019**
	IsoAVMVCAB	**0.87**	**2.40**	**1.29**	**4.43**	**0.0054**
Age		**0.03**	**1.04**	**1.02**	**1.06**	**0.0004**
Gender	Male	Reference				
	Female	**0.56**	**1.75**	**1.23**	**2.49**	**0.0020**
Race	White	Reference				
	Others	**0.47**	**1.59**	**1.13**	**2.24**	**0.0077**
Body Mass Index	Normal 18.5 - < 30.0	Reference				
	< 18.5	0.35	1.41	0.50	3.97	0.5119
	30.0 - 40.0	0.18	1.20	0.83	1.74	0.3415
	> 40.0	**0.87**	**2.39**	**1.18**	**4.82**	**0.0151**
Status of Procedure	Elective	Reference				
	Urgent	0.21	1.24	0.84	1.83	0.2848
	Emergent	0.76	2.13	0.72	6.33	0.1728
Hypertension	No	Reference				
	Yes	0.35	1.42	0.77	2.62	0.2671
Cerebrovascular Disease	No	Reference				
	Yes	0.34	1.40	0.99	2.00	0.0589
Pneumonia	No	Reference				
	Yes	0.18	1.20	0.63	2.30	0.5869
Chronic Lung Disease	None/Mild/Moderate	Reference				
	Severe	0.29	1.34	0.80	2.24	0.2734
Myocardial Infarction	No MI	Reference				
	< 24 hours	0.72	2.06	0.47	9.15	0.3405
	1 - 7 days ago	0.42	1.52	0.98	2.35	0.0616
Heart Failure	No	Reference				
	Yes	0.09	1.10	0.74	1.63	0.6419
Ejection Fraction (EF)	EF >=50%	Reference				
	EF less than 20%	**1.97**	**7.19**	**2.41**	**21.42**	**0.0004**
	EF 20- <30%	**0.99**	**2.70**	**1.49**	**4.90**	**0.0011**
	EF 30- <40%	**0.50**	**1.64**	**1.01**	**2.68**	**0.0460**
	EF 40- <50%	0.09	1.10	0.66	1.81	0.7221
Mitral Insufficiency	No	Reference				
	Yes	0.04	1.038	0.666	1.616	0.8705

Appendix B-1: Logistic Regression Risk Model for CABG + Valve Operative Mortality, 2023-2024

Risk Factor		Coefficient	Odds Ratio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Diabetes	No Diabetes/Non-Insulin	Reference				
	Insulin	0.20	1.22	0.80	1.86	0.3532
Bilirubin		**0.51**	**1.67**	**1.25**	**2.22**	**0.0005**
Dialysis	No	Reference				
	Yes	**1.16**	**3.18**	**1.96**	**5.16**	**<.0001**
Peripheral Arterial Disease	No	Reference				
	Yes	**0.63**	**1.88**	**1.23**	**2.85**	**0.0032**
Immunocompromise	No	Reference				
	Yes	0.10	1.11	0.53	2.30	0.7842
Prior Valve	No	Reference				
	Yes	**1.06**	**2.88**	**1.57**	**5.30**	**0.0006**
Previous PCI	No	Reference				
	Yes	1.09	2.97	0.49	17.81	0.2344

Bolded text indicates statistically significant (p≤0.05).

C Statistic =0.796

Hosmer-Lemeshow test: p-value=0.367

Appendix B-2: Hospital Risk-Adjusted CABG + Valve Operative Mortality Results by Region, 20223-2024

	Hospital	All CABG Cases	CABG + Valve Cases	CABG + Valve Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
State		**31,646**	**3,573**	**174**	**4.87**					
Sacramento Valley & Northern California Region	Adventist Health and Rideout	121	6	2	33.33	12.03	13.49	1.63	48.74	Average
	Enloe Medical Center - Esplanade	199	19	1	5.26	3.86	6.65	0.17	37.04	Average
	Mercy General Hospital	1402	195	4	2.05	4.21	2.37	0.65	6.07	Average
	Mercy Medical Center - Redding	160	24	3	12.50	4.84	12.59	2.60	36.79	Average
	Mercy San Juan Medical Center	223	35	3	8.57	5.09	8.21	1.69	23.98	Average
	Providence St. Joseph Hospital - Eureka	39	5	0	0.00	2.00	0.00	0.00	100.00	Average
	Shasta Regional Medical Center	203	32	0	0.00	3.97	0.00	0.00	14.16	Average
	Sutter Medical Center - Sacramento	1047	165	4	2.42	4.37	2.70	0.74	6.92	Average
	UC Davis Medical Center	198	18	2	11.11	4.28	12.63	1.53	45.63	Average
San Francisco Bay Area & San Jose	AHMC Seton Medical Center	43	.	.	.	.	.	.	.	NotAppplicable
	Adventist Health St. Helena	195	30	2	6.67	6.18	5.25	0.64	18.97	Average
	Alta Bates Summit Medical Center	288	37	4	10.81	10.33	5.10	1.39	13.05	Average
	California Pacific Medical Center - Van Ness Campus	190	18	0	0.00	3.04	0.00	0.00	32.79	Average
	Community Hospital of the Monterey Peninsula	163	36	0	0.00	3.87	0.00	0.00	12.91	Average
	Dominican Hospital	136	22	2	9.09	5.00	8.85	1.07	31.99	Average
	El Camino Hospital	213	15	0	0.00	3.77	0.00	0.00	31.77	Average
	Good Samaritan Hospital - San Jose	163	25	3	12.00	5.54	10.55	2.18	30.83	Average
	John Muir Medical Center - Concord Campus	530	66	4	6.06	5.22	5.66	1.54	14.49	Average
	Kaiser Foundation Hospital - San Francisco	1282	110	0	0.00	2.97	0.00	0.00	5.50	Average
	Kaiser Foundation Hospital - Santa Clara	1213	156	1	0.64	3.63	0.86	0.02	4.79	**Better**
	Marinhealth Medical Center	90	13	0	0.00	2.37	0.00	0.00	58.31	Average
	Mills-Peninsula Medical Center	134	20	1	5.00	4.08	5.97	0.15	33.26	Average
	North Bay Medical Center	104	7	0	0.00	2.47	0.00	0.00	100.00	Average
	O'Connor Hospital	98	7	0	0.00	3.69	0.00	0.00	69.59	Average
	Providence Queen of the Valley Medical Center	104	5	0	0.00	1.58	0.00	0.00	100.00	Average
	Providence Santa Rosa Memorial Hospital - Montgomery	161	21	0	0.00	6.17	0.00	0.00	13.88	Average
	Regional Medical Center of San Jose	32	.	.	.	.	.	.	.	NotAppplicable
	Salinas Valley Memorial Hospital	244	23	2	8.70	4.84	8.76	1.06	31.63	Average
	San Ramon Regional Medical Center	39	2	0	0.00	3.39	0.00	0.00	100.00	Average
	Santa Clara Valley Medical Center	145	30	1	3.33	4.64	3.50	0.09	19.49	Average
	Sequoia Hospital	173	34	3	8.82	5.31	8.09	1.67	23.64	Average
	Stanford Health Care	631	88	5	5.68	4.70	5.89	1.91	13.75	Average
	Stanford Health Care Tri-Valley	164	21	1	4.76	2.66	8.72	0.22	48.59	Average
	UC San Francisco Medical Center	248	25	1	4.00	4.21	4.63	0.12	25.78	Average
	Washington Hospital - Fremont	151	10	1	10.00	2.84	17.12	0.43	95.38	Average

Appendix B-2: Hospital Risk-Adjusted CABG + Valve Operative Mortality Results by Region, 20223-2024

	Hospital	All CABG Cases	CABG + Valve Cases	CABG + Valve Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
Central California	Adventist Health Bakersfield	169	10	1	10.00	3.40	14.31	0.36	79.74	Average
	Bakersfield Heart Hospital	61	.	.	.	.	.	.	.	NotAppplicable
	Bakersfield Memorial Hospital	164	7	1	14.29	4.98	13.98	0.35	77.89	Average
	Clovis Community Medical Center	285	38	4	10.53	7.08	7.24	1.97	18.54	Average
	Community Regional Medical Center - Fresno	173	16	2	12.50	11.82	5.15	0.62	18.60	Average
	Dameron Hospital	132	10	0	0.00	3.13	0.00	0.00	57.47	Average
	Doctors Medical Center	463	28	3	10.71	5.59	9.33	1.92	27.26	Average
	Fresno Heart and Surgical Hospital	511	61	2	3.28	5.48	2.91	0.35	10.53	Average
	Kaweah Health Medical Center	428	34	2	5.88	3.91	7.33	0.89	26.47	Average
	Marian Regional Medical Center	209	16	0	0.00	2.44	0.00	0.00	46.02	Average
	Memorial Medical Center - Modesto	298	22	0	0.00	3.73	0.00	0.00	21.88	Average
	Saint Agnes Medical Center	428	61	8	13.11	5.72	11.17	4.82	22.01	Average
	St. Joseph's Medical Center of Stockton	496	43	5	11.63	7.04	8.05	2.61	18.78	Average
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Adventist Health Glendale	191	18	0	0.00	3.89	0.00	0.00	25.63	Average
	Antelope Valley Hospital	97	5	1	20.00	2.59	37.63	0.95	100.00	Average
	Community Memorial Hospital - San Buenaventura	216	18	0	0.00	2.41	0.00	0.00	41.33	Average
	French Hospital Medical Center	190	31	1	3.23	3.15	4.99	0.13	27.81	Average
	Glendale Memorial Hospital and Health Center	127	9	0	0.00	3.86	0.00	0.00	51.76	Average
	Los Robles Hospital and Medical Center	165	19	2	10.53	4.90	10.46	1.27	37.78	Average
	Northridge Hospital Medical Center	148	9	2	22.22	4.49	24.10	2.92	87.07	Average
	Palmdale Regional Medical Center	6	.	.	.	.	.	.	.	NotAppplicable
	Providence Cedars-Sinai Tarzana Medical Center	152	12	0	0.00	2.72	0.00	0.00	55.11	Average
	Providence Holy Cross Medical Center	117	6	0	0.00	5.72	0.00	0.00	52.33	Average
	Providence Saint Joseph Medical Center	82	7	0	0.00	4.16	0.00	0.00	61.68	Average
	Santa Barbara Cottage Hospital	209	19	1	5.26	3.23	7.94	0.20	44.25	Average
	St. John's Regional Medical Center	110	9	1	11.11	10.41	5.20	0.13	28.96	Average
	Valley Presbyterian Hospital	54	1	0	0.00	4.89	0.00	0.00	100.00	Average
	West Hills Hospital and Medical Center	98	7	1	14.29	4.51	15.43	0.39	85.96	Average

Appendix B-2: Hospital Risk-Adjusted CABG + Valve Operative Mortality Results by Region, 20223-2024

	Hospital	All CABG Cases	CABG + Valve Cases	CABG + Valve Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
Greater Los Angeles	Adventist Health White Memorial	61	4	1	25.00	10.34	11.77	0.30	65.57	Average
	Adventist Health White Memorial Montebello	3	.	.	.	.	.	.	.	NotAppplicable
	California Hospital Medical Center - Los Angeles	122	8	0	0.00	3.07	0.00	0.00	73.15	Average
	Cedars Sinai Medical Center	526	54	0	0.00	3.00	0.00	0.00	11.08	Average
	Centinela Hospital Medical Center	98	5	0	0.00	19.56	0.00	0.00	18.37	Average
	Emanate Health Inter-Community Hospital	264	10	2	20.00	4.94	19.73	2.39	71.28	Average
	Garfield Medical Center	330	20	0	0.00	5.11	0.00	0.00	17.58	Average
	Henry Mayo Newhall Hospital	70	4	0	0.00	3.50	0.00	0.00	100.00	Average
	Hollywood Presbyterian Medical Center	59	1	0	0.00	12.27	0.00	0.00	100.00	Average
	Huntington Hospital	250	32	1	3.13	5.29	2.88	0.07	16.03	Average
	Kaiser Foundation Hospital - Los Angeles	1530	232	7	3.02	4.07	3.61	1.45	7.44	Average
	Keck Hospital of USC	322	73	7	9.59	7.41	6.31	2.54	12.99	Average
	Lakewood Regional Medical Center	197	16	1	6.25	4.55	6.69	0.17	37.27	Average
	Los Angeles County + USC Medical Center	92	4	0	0.00	1.33	0.00	0.00	100.00	Average
	Los Angeles County/Harbor - UCLA Medical Center	122	9	0	0.00	3.81	0.00	0.00	52.42	Average
	Memorialcare Long Beach Medical Center	309	52	3	5.77	8.62	3.26	0.67	9.52	Average
	PIH Health Good Samaritan Hospital	146	15	2	13.33	4.74	13.71	1.66	49.53	Average
	PIH Health Hospital - Downey	44	.	.	.	.	.	.	.	NotAppplicable
	PIH Health Hospital - Whittier	189	42	2	4.76	9.37	2.47	0.30	8.94	Average
	Providence Little Company of Mary Medical Center - Torrance	180	12	0	0.00	4.20	0.00	0.00	35.61	Average
	Providence St. John's Health Center	55	2	0	0.00	1.61	0.00	0.00	100.00	Average
	Ronald Reagan UCLA Medical Center	511	84	1	1.19	4.12	1.41	0.04	7.84	Average
	St. Francis Medical Center	46	2	0	0.00	2.42	0.00	0.00	100.00	Average
	St. Mary Medical Center - Long Beach	88	2	0	0.00	2.96	0.00	0.00	100.00	Average
	Torrance Memorial Medical Center	152	19	5	26.32	10.50	12.21	3.96	28.48	Average
	USC Arcadia Hospital	160	15	1	6.67	5.09	6.37	0.16	35.51	Average
Inland Empire, Riverside & San Bernardino	Arrowhead Regional Medical Center	55	6	0	0.00	3.70	0.00	0.00	80.85	Average
	Desert Regional Medical Center	143	9	1	11.11	5.61	9.64	0.24	53.74	Average
	Eisenhower Medical Center	295	33	0	0.00	5.79	0.00	0.00	9.41	Average
	Kaiser Foundation Hospital - Fontana	699	112	1	0.89	4.52	0.96	0.02	5.36	Average
	Loma Linda University Medical Center	512	57	6	10.53	6.38	8.03	2.95	17.49	Average
	Loma Linda University Medical Center - Murrieta	191	25	1	4.00	3.53	5.51	0.14	30.72	Average
	Pomona Valley Hospital Medical Center	272	16	2	12.50	3.59	16.96	2.05	61.27	Average
	Riverside Community Hospital	460	31	2	6.45	5.98	5.25	0.64	18.97	Average
	San Antonio Regional Hospital	361	29	1	3.45	5.98	2.81	0.07	15.64	Average
	St. Bernardine Medical Center	509	44	2	4.55	4.77	4.64	0.56	16.76	Average
	St. Mary Medical Center - Apple Valley	132	6	1	16.67	2.90	27.96	0.71	100.00	Average
	Temecula Valley Hospital	387	22	0	0.00	2.97	0.00	0.00	27.48	Average

Appendix B-2: Hospital Risk-Adjusted CABG + Valve Operative Mortality Results by Region, 20223-2024

	Hospital	All CABG Cases	CABG + Valve Cases	CABG + Valve Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (%, RAMR)	95% Confidence Limits RAMR		Performance Rating
								Lower Limit	Upper Limit	
Orange County	AHMC Anaheim Regional Medical Center	257	36	0	0.00	4.36	0.00	0.00	11.44	Average
	Fountain Valley Regional Hospital and Medical Center - Euclid	215	5	1	20.00	13.04	7.47	0.19	41.62	Average
	Hoag Memorial Hospital Presbyterian	493	63	2	3.17	4.44	3.48	0.42	12.58	Average
	Memorialcare Orange Coast Medical Center	293	38	0	0.00	5.68	0.00	0.00	8.32	Average
	Memorialcare Saddleback Medical Center	138	8	0	0.00	2.32	0.00	0.00	96.88	Average
	Orange County Global Medical Center	150	12	0	0.00	6.75	0.00	0.00	22.18	Average
	Providence Mission Hospital	224	18	3	16.67	3.87	20.99	4.33	61.34	Average
	Providence St. Joseph Hospital	342	34	2	5.88	4.49	6.39	0.77	23.07	Average
	Providence St. Jude Medical Center	228	34	2	5.88	5.23	5.47	0.66	19.77	Average
	UC Irvine Medical Center	315	36	6	16.67	8.15	9.95	3.65	21.66	Average
	West Anaheim Medical Center	80	2	0	0.00	1.55	0.00	0.00	100.00	Average
Greater San Diego	Grossmont Hospital	237	26	2	7.69	7.39	5.07	0.61	18.30	Average
	Palomar Medical Center	132	9	0	0.00	3.57	0.00	0.00	55.95	Average
	Scripps Memorial Hospital - La Jolla	900	140	10	7.14	4.88	7.13	3.42	13.11	Average
	Scripps Mercy Hospital	159	19	0	0.00	3.13	0.00	0.00	30.20	Average
	Sharp Chula Vista Medical Center	312	14	0	0.00	5.61	0.00	0.00	22.88	Average
	Sharp Memorial Hospital	293	59	4	6.78	3.93	8.39	2.29	21.49	Average
	Tri-City Medical Center	98	6	2	33.33	5.75	28.21	3.42	100.00	Average
	UC San Diego Health La Jolla - Jacobs Medical Center & Sulpizio Cardiovascular Center	533	71	3	4.23	4.32	4.76	0.98	13.91	Average

Appendix C-1: Logistic Regression Risk Model for Post-operative Stroke after Isolated CABG Surgery, 2023-2024

Risk Factor		Coefficent	Odds Ratio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Intercept		-5.88				<.0001
Age (Years)	Age <55	Reference				
	55 <= Age <65	-0.15	0.86	0.60	1.25	0.4321
	65<=Age <75	-0.05	0.95	0.67	1.36	0.7875
	Age >=75	0.07	1.08	0.73	1.59	0.7078
Gender	Male	Reference				
	Female	0.19	1.21	0.94	1.55	0.1384
Race	White	Reference				
	Asian	0.23	1.26	0.93	1.71	0.1299
	Black	**0.75**	**2.11**	**1.40**	**3.18**	**0.0004**
	Hispanic	-0.08	0.92	0.70	1.22	0.5823
	American Indian	-0.44	0.65	0.09	4.71	0.6666
	Pacific Islander	0.62	1.86	0.85	4.03	0.1186
Body Mass Index	Normal 18.5 - < 30.0	Reference				
	< 18.5	0.76	2.13	0.92	4.95	0.0774
	30.0 - 40.0	-0.08	0.92	0.72	1.18	0.5223
	> 40.0	0.47	1.60	0.99	2.58	0.0550
Status of Procedure	Elective	Reference				
	Urgent	**0.35**	**1.41**	**1.06**	**1.89**	**0.0184**
	Emergent	0.29	1.33	0.64	2.77	0.4459
Hypertension	No	Reference				
	Yes	0.19	1.21	0.79	1.86	0.3808
Cerebrovascular Disease	No	Reference				
	Yes	**0.78**	**2.17**	**1.73**	**2.74**	**<.0001**
Pneumonia	No	Reference				
	Yes	0.35	1.42	0.91	2.22	0.1218
Myocardial Infarction (MI)	No MI	Reference				
	< 24 hours	**0.99**	**2.70**	**1.48**	**4.92**	**0.0012**
	1 - 7 days ago	0.15	1.17	0.91	1.50	0.2346
Heart Failure	No	Reference				
	Yes	0.10	1.11	0.85	1.44	0.4399
Ejection Fraction (EF)	EF >=50%	Reference				
	EF less than 20%	0.36	1.44	0.51	4.02	0.4904
	EF 20- <30%	**0.50**	**1.66**	**1.07**	**2.57**	**0.0244**
	EF 30- <40%	0.13	1.14	0.79	1.66	0.4761
	EF 40- <50%	**0.38**	**1.46**	**1.09**	**1.96**	**0.0104**
Cardiogenic Shock	No	Reference				
	Yes	0.30	1.36	0.67	2.75	0.3993

Risk Factor		Coefficent	Odds Ratio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Arrhythmia	No	Reference				
	Yes	0.03	1.03	0.77	1.37	0.8597
Mitral Insufficiency	No	Reference				
	Yes	0.13	1.13	0.81	1.59	0.4659
Number of Diseased Coronary Vessels	None, One, or Two	Reference				
	3 or more	0.28	1.33	1.00	1.77	0.0518
Diabetes	No Diabetes	Reference				
	Non-Insulin	**0.42**	**1.52**	**1.18**	**1.96**	**0.0013**
	Insulin	**0.41**	**1.50**	**1.10**	**2.04**	**0.0095**
MELD Score	<10	Reference				
	>=10	**0.35**	**1.42**	**1.10**	**1.84**	**0.0071**
Dialysis	No	Reference				
	Yes	0.01	1.01	0.68	1.52	0.9457
Peripheral Arterial Disease	No	Reference				
	Yes	0.01	1.01	0.73	1.40	0.9474
Previous PCI	No PCI or PCI > 6 hours	Reference				
	< = 6 hours	0.66	1.93	0.78	4.77	0.1547

Bolded text indicates statistically significant (p≤0.05).

C Statistic =0.708

Hosmer-Lemeshow test: p-value=0.485

Appendix C-2: Hospital Risk-Adjusted Post-Operative Stroke After Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Post-Op Stroke	Observed Post-Op Stroke Rate (%)	Expected Post-Op Stroke Rate (%)	Risk-Adjusted Post-Op Stroke Rate (%, RASR)	95% Confidence Limits RASR		Performance Rating
								Lower Limit	Upper Limit	
State		**31,646**	**25,992**	**347**	**1.34**					
Sacramento Valley & Northern California Region	Adventist Health and Rideout	121	96	1	1.04	1.77	0.78	0.02	4.37	Average
	Enloe Medical Center - Esplanade	199	153	3	1.96	1.35	1.94	0.40	5.68	Average
	Mercy General Hospital	1402	1050	15	1.43	1.27	1.51	0.84	2.48	Average
	Mercy Medical Center - Redding	160	134	5	3.73	1.76	2.82	0.92	6.59	Average
	Mercy San Juan Medical Center	223	162	5	3.09	1.35	3.05	0.99	7.12	Average
	Providence St. Joseph Hospital - Eureka	39	33	0	0.00	1.52	0.00	0.00	9.84	Average
	Shasta Regional Medical Center	203	155	2	1.29	1.40	1.23	0.15	4.45	Average
	Sutter Medical Center - Sacramento	1047	814	8	0.98	1.18	1.11	0.48	2.19	Average
	UC Davis Medical Center	198	172	5	2.91	1.27	3.06	1.00	7.15	Average
San Francisco Bay Area & San Jose	AHMC Seton Medical Center	43	43	2	4.65	1.79	3.48	0.42	12.56	Average
	Adventist Health St. Helena	195	135	2	1.48	1.37	1.45	0.18	5.23	Average
	Alta Bates Summit Medical Center	288	243	2	0.82	1.70	0.65	0.08	2.33	Average
	California Pacific Medical Center - Van Ness Campus	190	149	1	0.67	1.15	0.78	0.02	4.34	Average
	Community Hospital of the Monterey Peninsula	163	110	1	0.91	1.02	1.19	0.03	6.63	Average
	Dominican Hospital	136	89	1	1.12	1.44	1.04	0.03	5.82	Average
	El Camino Hospital	213	182	1	0.55	1.10	0.67	0.02	3.71	Average
	Good Samaritan Hospital - San Jose	163	127	7	5.51	1.34	5.51	2.21	11.35	**Worse**
	John Muir Medical Center - Concord Campus	530	427	3	0.70	1.34	0.70	0.14	2.05	Average
	Kaiser Foundation Hospital - San Francisco	1282	1132	13	1.15	1.11	1.38	0.74	2.37	Average
	Kaiser Foundation Hospital - Santa Clara	1213	1001	12	1.20	1.24	1.29	0.66	2.25	Average
	Marinhealth Medical Center	90	70	0	0.00	0.88	0.00	0.00	7.99	Average
	Mills-Peninsula Medical Center	134	111	2	1.80	1.60	1.50	0.18	5.43	Average
	North Bay Medical Center	104	92	0	0.00	1.38	0.00	0.00	3.89	Average
	O'Connor Hospital	98	88	1	1.14	1.38	1.10	0.03	6.10	Average
	Providence Queen of the Valley Medical Center	104	98	1	1.02	1.28	1.06	0.03	5.93	Average
	Providence Santa Rosa Memorial Hospital - Montgomery	161	125	1	0.80	1.25	0.85	0.02	4.75	Average
	Regional Medical Center of San Jose	32	31	1	3.23	1.38	3.13	0.08	17.42	Average
	Salinas Valley Memorial Hospital	244	219	4	1.83	1.57	1.55	0.42	3.98	Average
	San Ramon Regional Medical Center	39	37	0	0.00	1.35	0.00	0.00	9.89	Average
	Santa Clara Valley Medical Center	145	103	1	0.97	1.41	0.92	0.02	5.11	Average
	Sequoia Hospital	173	111	1	0.90	1.24	0.97	0.02	5.42	Average
	Stanford Health Care	631	457	4	0.88	1.26	0.93	0.25	2.38	Average
	Stanford Health Care Tri-Valley	164	119	2	1.68	1.42	1.59	0.19	5.73	Average
	UC San Francisco Medical Center	248	210	2	0.95	1.22	1.04	0.13	3.75	Average
	Washington Hospital - Fremont	151	137	0	0.00	1.38	0.00	0.00	2.61	Average

Appendix C-2: Hospital Risk-Adjusted Post-Operative Stroke After Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Post-Op Stroke	Observed Post-Op Stroke Rate (%)	Expected Post-Op Stroke Rate (%)	Risk-Adjusted Post-Op Stroke Rate (%, RASR)	95% Confidence Limits RASR		Performance Rating
								Lower Limit	Upper Limit	
Central California	Adventist Health Bakersfield	169	157	1	0.64	1.46	0.58	0.01	3.25	Average
	Bakersfield Heart Hospital	61	61	1	1.64	1.05	2.08	0.05	11.58	Average
	Bakersfield Memorial Hospital	164	150	6	4.00	1.19	4.47	1.64	9.73	**Worse**
	Clovis Community Medical Center	285	238	2	0.84	1.19	0.95	0.11	3.42	Average
	Community Regional Medical Center - Fresno	173	153	3	1.96	1.90	1.38	0.28	4.04	Average
	Dameron Hospital	132	115	0	0.00	1.34	0.00	0.00	3.19	Average
	Doctors Medical Center	463	417	9	2.16	1.49	1.93	0.88	3.67	Average
	Fresno Heart and Surgical Hospital	511	413	5	1.21	1.22	1.32	0.43	3.09	Average
	Kaweah Health Medical Center	428	385	2	0.52	1.58	0.44	0.05	1.59	Average
	Marian Regional Medical Center	209	191	1	0.52	1.08	0.65	0.02	3.60	Average
	Memorial Medical Center - Modesto	298	266	4	1.50	1.44	1.39	0.38	3.56	Average
	Saint Agnes Medical Center	428	343	4	1.17	1.30	1.20	0.33	3.07	Average
	St. Joseph's Medical Center of Stockton	496	430	5	1.16	1.59	0.97	0.32	2.27	Average
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Adventist Health Glendale	191	167	1	0.60	1.00	0.80	0.02	4.44	Average
	Antelope Valley Hospital	97	90	3	3.33	1.75	2.55	0.52	7.44	Average
	Community Memorial Hospital - San Buenaventura	216	187	6	3.21	1.23	3.48	1.28	7.57	Average
	French Hospital Medical Center	190	150	1	0.67	1.02	0.88	0.02	4.88	Average
	Glendale Memorial Hospital and Health Center	127	111	3	2.70	1.19	3.04	0.63	8.88	Average
	Los Robles Hospital and Medical Center	165	135	2	1.48	1.26	1.57	0.19	5.66	Average
	Northridge Hospital Medical Center	148	136	3	2.21	1.20	2.46	0.51	7.18	Average
	Palmdale Regional Medical Center	6	5	0	0.00	1.43	0.00	0.00	69.10	Average
	Providence Cedars-Sinai Tarzana Medical Center	152	137	9	6.57	1.19	7.36	3.37	13.98	**Worse**
	Providence Holy Cross Medical Center	117	107	4	3.74	1.48	3.36	0.92	8.61	Average
	Providence Saint Joseph Medical Center	82	74	3	4.05	0.93	5.84	1.21	17.08	Average
	Santa Barbara Cottage Hospital	209	177	1	0.56	1.26	0.60	0.02	3.33	Average
	St. John's Regional Medical Center	110	96	1	1.04	1.36	1.02	0.03	5.70	Average
	Valley Presbyterian Hospital	54	52	1	1.92	1.33	1.93	0.05	10.76	Average
	West Hills Hospital and Medical Center	98	87	0	0.00	1.27	0.00	0.00	4.46	Average

Appendix C-2: Hospital Risk-Adjusted Post-Operative Stroke After Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Post-Op Stroke	Observed Post-Op Stroke Rate (%)	Expected Post-Op Stroke Rate (%)	Risk-Adjusted Post-Op Stroke Rate (%, RASR)	95% Confidence Limits RASR		Performance Rating
								Lower Limit	Upper Limit	
Greater Los Angeles	Adventist Health White Memorial	61	56	0	0.00	0.95	0.00	0.00	9.24	Average
	Adventist Health White Memorial Montebello	3	3	0	0.00	0.76	0.00	0.00	100.00	Average
	California Hospital Medical Center - Los Angeles	122	111	3	2.70	1.37	2.63	0.54	7.69	Average
	Cedars Sinai Medical Center	526	416	3	0.72	1.07	0.90	0.18	2.62	Average
	Centinela Hospital Medical Center	98	92	1	1.09	2.48	0.59	0.01	3.26	Average
	Emanate Health Inter-Community Hospital	264	252	7	2.78	1.44	2.58	1.04	5.31	Average
	Garfield Medical Center	330	292	0	0.00	1.26	0.00	0.00	1.34	Average
	Henry Mayo Newhall Hospital	70	62	1	1.61	1.45	1.48	0.04	8.26	Average
	Hollywood Presbyterian Medical Center	59	56	0	0.00	2.74	0.00	0.00	3.21	Average
	Huntington Hospital	250	202	3	1.49	1.29	1.54	0.32	4.51	Average
	Kaiser Foundation Hospital - Los Angeles	1530	1270	10	0.79	1.36	0.78	0.37	1.43	Average
	Keck Hospital of USC	322	166	3	1.81	1.31	1.84	0.38	5.38	Average
	Lakewood Regional Medical Center	197	181	0	0.00	1.46	0.00	0.00	1.86	Average
	Los Angeles County + USC Medical Center	92	82	1	1.22	1.13	1.44	0.04	8.02	Average
	Los Angeles County/Harbor - UCLA Medical Center	122	96	0	0.00	1.14	0.00	0.00	4.48	Average
	Memorialcare Long Beach Medical Center	309	231	6	2.60	1.69	2.05	0.75	4.46	Average
	PIH Health Good Samaritan Hospital	146	114	4	3.51	1.46	3.21	0.87	8.21	Average
	PIH Health Hospital - Downey	44	43	0	0.00	1.34	0.00	0.00	8.57	Average
	PIH Health Hospital - Whittier	189	134	1	0.75	1.51	0.66	0.02	3.68	Average
	Providence Little Company of Mary Medical Center - Torrance	180	163	3	1.84	1.58	1.56	0.32	4.56	Average
	Providence St. John's Health Center	55	52	0	0.00	1.04	0.00	0.00	9.08	Average
	Ronald Reagan UCLA Medical Center	511	342	4	1.17	1.20	1.30	0.36	3.34	Average
	St. Francis Medical Center	46	44	0	0.00	1.62	0.00	0.00	6.92	Average
	St. Mary Medical Center - Long Beach	88	86	2	2.33	1.58	1.97	0.24	7.10	Average
	Torrance Memorial Medical Center	152	126	6	4.76	1.28	4.97	1.82	10.81	**Worse**
	USC Arcadia Hospital	160	136	7	5.15	1.58	4.34	1.74	8.93	**Worse**

Appendix C-2: Hospital Risk-Adjusted Post-Operative Stroke After Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases	Isolated CABG Post-Op Stroke	Observed Post-Op Stroke Rate (%)	Expected Post-Op Stroke Rate (%)	Risk-Adjusted Post-Op Stroke Rate (%, RASR)	95% Confidence Limits RASR		Performance Rating
								Lower Limit	Upper Limit	
Inland Empire, Riverside & San Bernardino	Arrowhead Regional Medical Center	55	47	1	2.13	1.35	2.11	0.05	11.74	Average
	Desert Regional Medical Center	143	130	1	0.77	1.26	0.81	0.02	4.53	Average
	Eisenhower Medical Center	295	252	0	0.00	1.19	0.00	0.00	1.64	Average
	Kaiser Foundation Hospital - Fontana	699	574	5	0.87	1.27	0.91	0.30	2.13	Average
	Loma Linda University Medical Center	512	405	4	0.99	1.47	0.90	0.24	2.29	Average
	Loma Linda University Medical Center - Murrieta	191	157	1	0.64	1.09	0.78	0.02	4.36	Average
	Pomona Valley Hospital Medical Center	272	254	4	1.57	1.87	1.12	0.31	2.88	Average
	Riverside Community Hospital	460	367	1	0.27	1.19	0.30	0.01	1.70	Average
	San Antonio Regional Hospital	361	303	3	0.99	1.30	1.01	0.21	2.96	Average
	St. Bernardine Medical Center	509	456	3	0.66	1.38	0.63	0.13	1.86	Average
	St. Mary Medical Center - Apple Valley	132	125	0	0.00	1.65	0.00	0.00	2.38	Average
	Temecula Valley Hospital	387	344	3	0.87	1.20	0.97	0.20	2.85	Average
Orange County	AHMC Anaheim Regional Medical Center	257	207	7	3.38	1.38	3.26	1.31	6.72	Average
	Fountain Valley Regional Hospital and Medical Center - Euclid	215	210	2	0.95	1.65	0.77	0.09	2.79	Average
	Hoag Memorial Hospital Presbyterian	493	357	0	0.00	1.18	0.00	0.00	1.17	**Better**
	Memorialcare Orange Coast Medical Center	293	239	2	0.84	1.39	0.81	0.10	2.91	Average
	Memorialcare Saddleback Medical Center	138	127	6	4.72	1.17	5.38	1.97	11.70	**Worse**
	Orange County Global Medical Center	150	133	1	0.75	1.39	0.72	0.02	4.04	Average
	Providence Mission Hospital	224	175	0	0.00	1.15	0.00	0.00	2.45	Average
	Providence St. Joseph Hospital	342	284	4	1.41	1.27	1.48	0.40	3.78	Average
	Providence St. Jude Medical Center	228	178	0	0.00	1.43	0.00	0.00	1.94	Average
	UC Irvine Medical Center	315	235	9	3.83	1.79	2.86	1.31	5.44	Average
	West Anaheim Medical Center	80	78	2	2.56	2.15	1.59	0.19	5.74	Average
Greater San Diego	Grossmont Hospital	237	203	6	2.96	1.79	2.21	0.81	4.81	Average
	Palomar Medical Center	132	121	1	0.83	1.43	0.77	0.02	4.29	Average
	Scripps Memorial Hospital - La Jolla	900	712	8	1.12	1.20	1.25	0.54	2.45	Average
	Scripps Mercy Hospital	159	129	3	2.33	1.31	2.36	0.49	6.91	Average
	Sharp Chula Vista Medical Center	312	286	4	1.40	1.47	1.27	0.34	3.24	Average
	Sharp Memorial Hospital	293	183	4	2.19	1.10	2.65	0.72	6.80	Average
	Tri-City Medical Center	98	81	1	1.23	1.36	1.21	0.03	6.75	Average
	UC San Diego Health La Jolla - Jacobs Medical Center & Sulpizio Cardiovascular Center	533	387	6	1.55	1.25	1.66	0.61	3.61	Average

Appendix D-1: Logistic Regression Risk Model for Hospital 30-Day Readmission,

Risk Factor		Coefficient	Odds Rtio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Intercept		-3.93				<.0001
Age (Years)		**0.01**	**1.01**	**1.01**	**1.02**	**<.0001**
Gender	Male					
	Female	**0.34**	**1.40**	**1.27**	**1.56**	**<.0001**
Race	White					
	Asian	0.00	1.00	0.87	1.14	0.9445
	Black	0.04	1.04	0.84	1.28	0.7133
	Hispanic	-0.11	0.89	0.80	1.00	0.0509
	American Indian	-0.06	0.94	0.50	1.79	0.8576
	Pacific Islander	0.10	1.11	0.74	1.65	0.6144
Body Mass Index	Normal 18.5 - < 30.0					
	< 18.5	0.12	1.13	0.68	1.87	0.6411
	30.0 - 40.0	**0.11**	**1.12**	**1.01**	**1.23**	**0.0290**
	> 40.0	**0.64**	**1.89**	**1.54**	**2.33**	**<.0001**
Status of Procedure	Elective					
	Urgent	**0.30**	**1.35**	**1.21**	**1.51**	**<.0001**
	Emergent	**0.42**	**1.52**	**1.09**	**2.12**	**0.0147**
Hypertension	No					
	Yes	0.04	1.05	0.89	1.24	0.6018
Cerebrovascular Disease	No					
	Yes	**0.21**	**1.23**	**1.10**	**1.38**	**0.0002**
Chronic Lung Disease	None/Mild/Moderate					
	Severe	**0.32**	**1.38**	**1.18**	**1.61**	**<.0001**
Myocardial Infarction (MI)	No MI					
	< 24 hours	0.24	1.27	0.89	1.80	0.1881
	1 - 7 days ago	0.05	1.05	0.94	1.17	0.4103
Heart Failure	No					
	Yes	**0.23**	**1.25**	**1.12**	**1.40**	**<.0001**
Ejection Fraction (EF)	EF >=50%					
	EF less than 20%	0.36	1.43	0.89	2.30	0.1448
	EF 20- <30%	-0.03	0.97	0.78	1.21	0.8040
	EF 30- <40%	0.12	1.13	0.96	1.32	0.1412
	EF 40- <50%	**0.15**	**1.16**	**1.02**	**1.32**	**0.0224**
Cardiogenic Shock	No					
	Yes	0.24	1.27	0.82	1.94	0.2821

Appendix D-1: Logistic Regression Risk Model for Hospital 30-Day Readmission,

Risk Factor		Coefficient	Odds Rtio (OR)	95% Confidence Limits		p-value
				Lower Level	Upper Level	
Atrial Fibrillation	No					
	Yes	**0.33**	**1.39**	**1.22**	**1.58**	**<.0001**
Mitral Insufficiency	None, Trival, Mild					
	Moderate/Severe	**0.18**	**1.20**	**1.04**	**1.40**	**0.0152**
Infectious Endocarditis	No					
	Yes	0.61	1.84	0.66	5.17	0.2444
Left Main Disease	No					
	Yes	0.04	1.05	0.95	1.15	0.3583
Number of Diseased Coronary Vessels	None, One, or Two					
	3 or more	0.01	1.01	0.91	1.13	0.8465
Diabetes	No Diabetes					
	Non-Insulin	**0.20**	**1.22**	**1.10**	**1.35**	**0.0002**
	Insulin	**0.42**	**1.52**	**1.34**	**1.72**	**<.0001**
MELD Score	<10					
	>=10	**0.26**	**1.29**	**1.16**	**1.45**	**<.0001**
Dialysis	No					
	Yes	**0.59**	**1.80**	**1.52**	**2.13**	**<.0001**
Peripheral Arterial Disease	No					
	Yes	**0.32**	**1.38**	**1.21**	**1.58**	**<.0001**
Immunocompromise	No					
	Yes	**0.36**	**1.43**	**1.14**	**1.78**	**0.0017**
Cancer Within 5 years	No					
	Yes	0.01	1.01	0.81	1.24	0.9540
Prior Carotid Surgery	No					
	Yes	0.02	1.02	0.75	1.37	0.9209
Dual Payer Status	No					
	Yes	0.09	1.09	0.96	1.23	0.1769

Bolded text indicates statistically significant (p≤0.05).

C Statistic =0.662

Hosmer-Lemeshow test: p-value=0.152

Appendix D-2: Hospital Risk-Adjusted CABG 30-Day Readmission after Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases, Discharged Alive	Isolated CABG Readmission	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (%, RARR)	95% Confidence Limits RARR		Performance Rating
								Lower Limit	Upper Limit	
State		**31,646**	**20,992**	**2,305**	**10.98**					
Sacramento Valley & Northern California Region	Adventist Health and Rideout	121	82	11	13.41	12.98	11.35	5.67	20.31	Average
	Enloe Medical Center - Esplanade	199	140	13	9.29	11.58	8.80	4.69	15.05	Average
	Mercy General Hospital	1402	955	69	7.23	10.69	7.42	5.77	9.39	**Better**
	Mercy Medical Center - Redding	160	117	21	17.95	13.71	14.37	8.90	21.97	Average
	Mercy San Juan Medical Center	223	153	21	13.73	10.45	14.42	8.93	22.04	Average
	Providence St. Joseph Hospital - Eureka	39	32	6	18.75	13.41	15.35	5.63	33.42	Average
	Shasta Regional Medical Center	203	149	20	13.42	12.03	12.26	7.49	18.93	Average
	Sutter Medical Center - Sacramento	1047	695	79	11.37	10.86	11.49	9.10	14.32	Average
	UC Davis Medical Center	198	138	10	7.25	11.34	7.02	3.37	12.91	Average
San Francisco Bay Area & San Jose	AHMC Seton Medical Center	43	30	6	20.00	12.31	17.84	6.55	38.84	Average
	Adventist Health St. Helena	195	115	15	13.04	10.34	13.85	7.75	22.85	Average
	Alta Bates Summit Medical Center	288	186	21	11.29	14.19	8.74	5.41	13.35	Average
	California Pacific Medical Center - Van Ness Campus	190	111	11	9.91	10.15	10.72	5.35	19.18	Average
	Community Hospital of the Monterey Peninsula	163	94	11	11.70	8.94	14.37	7.17	25.72	Average
	Dominican Hospital	136	75	10	13.33	10.73	13.64	6.54	25.09	Average
	El Camino Hospital	213	117	9	7.69	10.51	8.04	3.68	15.26	Average
	Good Samaritan Hospital - San Jose	163	88	12	13.64	10.73	13.95	7.21	24.38	Average
	John Muir Medical Center - Concord Campus	530	341	25	7.33	11.19	7.20	4.66	10.62	**Better**
	Kaiser Foundation Hospital - San Francisco	1282	1104	73	6.61	9.44	7.69	6.03	9.67	**Better**
	Kaiser Foundation Hospital - Santa Clara	1213	968	65	6.71	10.33	7.14	5.51	9.10	**Better**
	Marinhealth Medical Center	90	52	3	5.77	8.26	7.67	1.58	22.42	Average
	Mills-Peninsula Medical Center	134	79	5	6.33	10.77	6.45	2.09	15.05	Average
	North Bay Medical Center	104	78	9	11.54	10.19	12.44	5.69	23.61	Average
	O'Connor Hospital	98	71	11	15.49	11.65	14.60	7.29	26.12	Average
	Providence Queen of the Valley Medical Center	104	74	9	12.16	11.48	11.64	5.32	22.09	Average
	Providence Santa Rosa Memorial Hospital - Montgomery	161	112	12	10.71	11.20	10.50	5.43	18.34	Average
	Regional Medical Center of San Jose	32	24	4	16.67	11.56	15.83	4.31	40.53	Average
	Salinas Valley Memorial Hospital	244	207	18	8.70	12.18	7.84	4.65	12.39	Average
	San Ramon Regional Medical Center	39	29	3	10.34	9.54	11.90	2.45	34.79	Average
	Santa Clara Valley Medical Center	145	81	6	7.41	10.87	7.48	2.75	16.28	Average
	Sequoia Hospital	173	82	9	10.98	10.12	11.91	5.45	22.61	Average
	Stanford Health Care	631	257	19	7.39	11.71	6.93	4.17	10.83	**Better**
	Stanford Health Care Tri-Valley	164	74	9	12.16	11.71	11.40	5.21	21.64	Average
	UC San Francisco Medical Center	248	149	21	14.09	11.02	14.05	8.70	21.47	Average
	Washington Hospital - Fremont	151	109	13	11.93	9.36	14.00	7.45	23.94	Average

Appendix D-2: Hospital Risk-Adjusted CABG 30-Day Readmission after Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases, Discharged Alive	Isolated CABG Readmission	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (%, RARR)	95% Confidence Limits RARR		Performance Rating
								Lower Limit	Upper Limit	
Central California	Adventist Health Bakersfield	169	120	17	14.17	11.10	14.01	8.16	22.43	Average
	Bakersfield Heart Hospital	61	48	5	10.42	8.76	13.06	4.24	30.48	Average
	Bakersfield Memorial Hospital	164	131	12	9.16	9.50	10.59	5.47	18.50	Average
	Clovis Community Medical Center	285	214	19	8.88	10.67	9.14	5.50	14.27	Average
	Community Regional Medical Center - Fresno	173	130	27	20.77	13.58	16.80	11.07	24.44	**Worse**
	Dameron Hospital	132	92	10	10.87	12.20	9.78	4.69	17.99	Average
	Doctors Medical Center	463	288	55	19.10	12.31	17.03	12.83	22.17	**Worse**
	Fresno Heart and Surgical Hospital	511	374	47	12.57	11.38	12.13	8.91	16.13	Average
	Kaweah Health Medical Center	428	332	48	14.46	13.39	11.85	8.74	15.71	Average
	Marian Regional Medical Center	209	168	24	14.29	9.83	15.96	10.23	23.75	Average
	Memorial Medical Center - Modesto	298	232	35	15.09	12.27	13.50	9.40	18.77	Average
	Saint Agnes Medical Center	428	274	33	12.04	11.21	11.80	8.12	16.57	Average
	St. Joseph's Medical Center of Stockton	496	358	56	15.64	12.67	13.56	10.24	17.60	Average
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Adventist Health Glendale	191	94	8	8.51	9.73	9.61	4.15	18.93	Average
	Antelope Valley Hospital	97	82	11	13.41	11.32	13.01	6.49	23.28	Average
	Community Memorial Hospital - San Buenaventura	216	124	7	5.65	10.60	5.85	2.35	12.05	Average
	French Hospital Medical Center	190	130	9	6.92	9.43	8.06	3.69	15.30	Average
	Glendale Memorial Hospital and Health Center	127	89	12	13.48	10.98	13.49	6.97	23.56	Average
	Los Robles Hospital and Medical Center	165	115	22	19.13	10.59	19.83	12.43	30.02	**Worse**
	Northridge Hospital Medical Center	148	107	25	23.36	10.37	24.75	16.02	36.54	**Worse**
	Palmdale Regional Medical Center	6	4	2	50.00	15.82	34.70	4.20	100.00	Average
	Providence Cedars-Sinai Tarzana Medical Center	152	91	14	15.38	9.99	16.91	9.24	28.37	Average
	Providence Holy Cross Medical Center	117	76	7	9.21	11.72	8.63	3.47	17.78	Average
	Providence Saint Joseph Medical Center	82	62	10	16.13	9.39	18.86	9.05	34.69	Average
	Santa Barbara Cottage Hospital	209	151	18	11.92	10.92	11.99	7.10	18.95	Average
	St. John's Regional Medical Center	110	77	12	15.58	10.47	16.35	8.45	28.55	Average
	Valley Presbyterian Hospital	54	35	7	20.00	10.95	20.05	8.06	41.32	Average
	West Hills Hospital and Medical Center	98	65	10	15.38	10.38	16.28	7.80	29.93	Average

Appendix D-2: Hospital Risk-Adjusted CABG 30-Day Readmission after Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases, Discharged Alive	Isolated CABG Readmission	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (%, RARR)	95% Confidence Limits RARR		Performance Rating
								Lower Limit	Upper Limit	
Greater Los Angeles	Adventist Health White Memorial	61	35	1	2.86	8.55	3.67	0.09	20.44	Average
	Adventist Health White Memorial Montebello	3	.	.	.	.	.	.	.	Not Applicable
	California Hospital Medical Center - Los Angeles	122	76	8	10.53	10.37	11.15	4.81	21.96	Average
	Cedars Sinai Medical Center	526	240	23	9.58	9.55	11.02	6.99	16.54	Average
	Centinela Hospital Medical Center	98	63	25	39.68	13.44	32.41	20.97	47.84	**Worse**
	Emanate Health Inter-Community Hospital	264	217	30	13.82	10.97	13.84	9.34	19.76	Average
	Garfield Medical Center	330	118	21	17.80	10.44	18.71	11.58	28.60	**Worse**
	Henry Mayo Newhall Hospital	70	52	5	9.62	11.07	9.53	3.10	22.25	Average
	Hollywood Presbyterian Medical Center	59	34	2	5.88	10.36	6.23	0.76	22.52	Average
	Huntington Hospital	250	163	15	9.20	10.20	9.90	5.54	16.33	Average
	Kaiser Foundation Hospital - Los Angeles	1530	1227	104	8.48	10.89	8.55	6.99	10.36	**Better**
	Keck Hospital of USC	322	52	7	13.46	12.08	12.23	4.92	25.20	Average
	Lakewood Regional Medical Center	197	120	17	14.17	12.41	12.53	7.30	20.06	Average
	Los Angeles County + USC Medical Center	92	44	7	15.91	8.45	20.68	8.31	42.60	Average
	Los Angeles County/Harbor - UCLA Medical Center	122	52	4	7.69	11.12	7.60	2.07	19.46	Average
	Memorialcare Long Beach Medical Center	309	185	26	14.05	12.42	12.42	8.11	18.20	Average
	PIH Health Good Samaritan Hospital	146	77	8	10.39	10.90	10.47	4.52	20.63	Average
	PIH Health Hospital - Downey	44	32	8	25.00	12.27	22.37	9.66	44.07	Average
	PIH Health Hospital - Whittier	189	116	20	17.24	13.12	14.43	8.82	22.29	Average
	Providence Little Company of Mary Medical Center - Torrance	180	135	15	11.11	10.88	11.22	6.28	18.50	Average
	Providence St. John's Health Center	55	46	3	6.52	9.41	7.61	1.57	22.23	Average
	Ronald Reagan UCLA Medical Center	511	218	23	10.55	10.89	10.64	6.74	15.96	Average
	St. Francis Medical Center	46	25	3	12.00	10.54	12.50	2.58	36.54	Average
	St. Mary Medical Center - Long Beach	88	65	17	26.15	12.56	22.86	13.32	36.61	**Worse**
	Torrance Memorial Medical Center	152	98	18	18.37	10.38	19.42	11.51	30.69	**Worse**
	USC Arcadia Hospital	160	118	15	12.71	11.66	11.98	6.70	19.75	Average

Appendix D-2: Hospital Risk-Adjusted CABG 30-Day Readmission after Isolated CABG Results by Region, 2023-2024

Region	Hospital	All CABG Cases	Isolated CABG Cases, Discharged Alive	Isolated CABG Readmission	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (%, RARR)	95% Confidence Limits RARR		Performance Rating
								Lower Limit	Upper Limit	
Inland Empire, Riverside & San Bernardino	Arrowhead Regional Medical Center	55	36	6	16.67	10.49	17.45	6.40	37.98	Average
	Desert Regional Medical Center	143	106	13	12.26	10.78	12.49	6.65	21.36	Average
	Eisenhower Medical Center	295	193	20	10.36	10.75	10.58	6.46	16.34	Average
	Kaiser Foundation Hospital - Fontana	699	546	36	6.59	10.78	6.72	4.70	9.30	**Better**
	Loma Linda University Medical Center	512	313	36	11.50	11.57	10.92	7.65	15.12	Average
	Loma Linda University Medical Center - Murrieta	191	120	19	15.83	10.49	16.57	9.97	25.87	Average
	Pomona Valley Hospital Medical Center	272	215	31	14.42	12.33	12.84	8.72	18.22	Average
	Riverside Community Hospital	460	275	20	7.27	10.22	7.81	4.77	12.06	Average
	San Antonio Regional Hospital	361	273	26	9.52	10.73	9.75	6.37	14.28	Average
	St. Bernardine Medical Center	509	391	58	14.83	12.15	13.41	10.18	17.34	Average
	St. Mary Medical Center - Apple Valley	132	95	9	9.47	11.79	8.82	4.03	16.75	Average
	Temecula Valley Hospital	387	270	22	8.15	9.87	9.07	5.68	13.73	Average
Orange County	AHMC Anaheim Regional Medical Center	257	101	16	15.84	11.80	14.74	8.42	23.93	Average
	Fountain Valley Regional Hospital and Medical Center - Euclid	215	129	12	9.30	12.46	8.20	4.23	14.32	Average
	Hoag Memorial Hospital Presbyterian	493	293	13	4.44	9.38	5.19	2.76	8.88	**Better**
	Memorialcare Orange Coast Medical Center	293	218	19	8.72	10.02	9.55	5.75	14.92	Average
	Memorialcare Saddleback Medical Center	138	111	7	6.31	9.84	7.04	2.83	14.50	Average
	Orange County Global Medical Center	150	83	14	16.87	11.99	15.45	8.44	25.91	Average
	Providence Mission Hospital	224	137	10	7.30	10.54	7.61	3.65	13.99	Average
	Providence St. Joseph Hospital	342	206	18	8.74	10.82	8.86	5.25	14.01	Average
	Providence St. Jude Medical Center	228	134	7	5.22	10.67	5.37	2.16	11.07	Average
	UC Irvine Medical Center	315	172	15	8.72	13.06	7.33	4.10	12.09	Average
	West Anaheim Medical Center	80	44	7	15.91	14.65	11.93	4.80	24.57	Average
Greater San Diego	Grossmont Hospital	237	180	32	17.78	12.63	15.46	10.57	21.82	Average
	Palomar Medical Center	132	99	16	16.16	10.18	17.44	9.97	28.32	Average
	Scripps Memorial Hospital - La Jolla	900	521	75	14.40	10.61	14.90	11.72	18.68	**Worse**
	Scripps Mercy Hospital	159	119	12	10.08	10.43	10.62	5.49	18.54	Average
	Sharp Chula Vista Medical Center	312	241	41	17.01	12.33	15.15	10.87	20.55	Average
	Sharp Memorial Hospital	293	159	21	13.21	9.55	15.19	9.40	23.21	Average
	Tri-City Medical Center	98	29	5	17.24	10.92	17.34	5.63	40.46	Average
	UC San Diego Health La Jolla - Jacobs Medical Center & Sulpizio Cardiovascular Center	533	344	23	6.69	10.46	7.02	4.45	10.53	**Better**

Appendix E: Hospital Internal Mammary Artery Usage Results for Isolated CABG by Region, 2024

Region	Hospital	Isolated CABGs	Percent IMA Use
State		**12,357**	**99.34%**
Sacramento Valley & Northern California Region	Adventist Health and Rideout	41	100.00%
	Enloe Medical Center - Esplanade	66	98.48%
	Mercy General Hospital	501	100.00%
	Mercy Medical Center - Redding	58	100.00%
	Mercy San Juan Medical Center	81	100.00%
	Providence St. Joseph Hospital - Eureka	15	100.00%
	Shasta Regional Medical Center	78	100.00%
	Sutter Medical Center - Sacramento	392	99.49%
	UC Davis Medical Center	83	100.00%
San Francisco Bay Area & San Jose	Adventist Health St. Helena	73	100.00%
	AHMC Seton Medical Center	19	94.74%
	Alta Bates Summit Medical Center	121	100.00%
	California Pacific Medical Center - Van Ness Campus	64	100.00%
	Community Hospital of the Monterey Peninsula	44	100.00%
	Dominican Hospital	34	100.00%
	El Camino Hospital	93	100.00%
	Good Samaritan Hospital - San Jose	83	100.00%
	John Muir Medical Center - Concord Campus	188	98.40%
	Kaiser Foundation Hospital - San Francisco	577	100.00%
	Kaiser Foundation Hospital - Santa Clara	499	100.00%
	Marinhealth Medical Center	40	100.00%
	Mills-Peninsula Medical Center	53	100.00%
	North Bay Medical Center	51	100.00%
	O'Connor Hospital	40	100.00%
	Providence Queen of the Valley Medical Center	45	100.00%
	Providence Santa Rosa Memorial Hospital - Montgomery	62	100.00%
	Salinas Valley Health Medical Center	100	99.00%
	San Ramon Regional Medical Center	20	100.00%
	Santa Clara Valley Medical Center	56	100.00%
	Sequoia Hospital	50	98.00%
	Stanford Health Care	231	100.00%
	Stanford Health Care Tri-Valley	58	100.00%
	UC San Francisco Medical Center	90	98.89%
	Washington Hospital - Fremont	72	98.61%

Appendix E: Hospital Internal Mammary Artery Usage Results for Isolated CABG by Region, 2024

Region	Hospital	Isolated CABGs	Percent IMA Use
Central California	Adventist Health Bakersfield	89	98.88%
	Bakersfield Heart Hospital	18	100.00%
	Bakersfield Memorial Hospital	62	100.00%
	Clovis Community Medical Center	142	99.30%
	Community Regional Medical Center - Fresno	76	98.68%
	Dameron Hospital	45	100.00%
	Doctors Medical Center	202	98.51%
	Fresno Heart and Surgical Hospital	184	99.46%
	Kaweah Health Medical Center	148	100.00%
	Marian Regional Medical Center	89	100.00%
	Memorial Medical Center - Modesto	111	92.79%
	Saint Agnes Medical Center	126	99.21%
	St. Joseph's Medical Center of Stockton	169	98.22%
San Fernando Valley, Antelope Valley, Ventura & Santa Barbara	Adventist Health Glendale	74	94.59%
	Antelope Valley Hospital	40	100.00%
	Community Memorial Hospital - San Buenaventura	82	100.00%
	French Hospital Medical Center	65	100.00%
	Glendale Memorial Hospital and Health Center	50	100.00%
	Los Robles Hospital and Medical Center	64	98.44%
	Northridge Hospital Medical Center	75	100.00%
	Palmdale Regional Medical Center	5	100.00%
	Providence Cedars-Sinai Tarzana Medical Center	63	100.00%
	Providence Holy Cross Medical Center	58	100.00%
	Providence Saint Joseph Medical Center	34	100.00%
	Santa Barbara Cottage Hospital	85	100.00%
	St. John's Regional Medical Center	49	100.00%
	Valley Presbyterian Hospital	23	100.00%
	West Hills Hospital and Medical Center	38	100.00%

Appendix E: Hospital Internal Mammary Artery Usage Results for Isolated CABG by Region, 2024

Region	Hospital	Isolated CABGs	Percent IMA Use
Greater Los Angeles	Adventist Health White Memorial	23	100.00%
	California Hospital Medical Center - Los Angeles	61	100.00%
	Cedars Sinai Medical Center	212	99.53%
	Centinela Hospital Medical Center	49	95.92%
	Emanate Health Inter-Community Hospital	110	100.00%
	Garfield Medical Center	138	97.10%
	Henry Mayo Newhall Hospital	29	100.00%
	Hollywood Presbyterian Medical Center	22	100.00%
	Huntington Hospital	105	100.00%
	Kaiser Foundation Hospital - Los Angeles	642	99.69%
	Keck Hospital of USC	84	98.81%
	Lakewood Regional Medical Center	81	100.00%
	Los Angeles County + USC Medical Center	45	100.00%
	Los Angeles County/Harbor - UCLA Medical Center	51	100.00%
	Memorialcare Long Beach Medical Center	106	100.00%
	PIH Health Good Samaritan Hospital	57	100.00%
	PIH Health Hospital - Downey	26	100.00%
	PIH Health Hospital - Whittier	58	86.21%
	Providence Little Company of Mary Medical Center - Torrance	79	100.00%
	Providence St. John's Health Center	21	95.24%
	Ronald Reagan UCLA Medical Center	168	100.00%
	St. Francis Medical Center	20	100.00%
	St. Mary Medical Center - Long Beach	28	100.00%
	Torrance Memorial Medical Center	62	100.00%
	USC Arcadia Hospital	58	100.00%

Appendix E: Hospital Internal Mammary Artery Usage Results for Isolated CABG by Region, 2024

Region	Hospital	Isolated CABGs	Percent IMA Use
Inland Empire, Riverside & San Bernardino	Arrowhead Regional Medical Center	31	100.00%
	Desert Regional Medical Center	53	100.00%
	Eisenhower Medical Center	106	99.06%
	Kaiser Foundation Hospital - Fontana	277	99.64%
	Loma Linda University Medical Center	193	98.96%
	Loma Linda University Medical Center - Murrieta	67	100.00%
	Pomona Valley Hospital Medical Center	113	100.00%
	Riverside Community Hospital	195	100.00%
	San Antonio Regional Hospital	136	100.00%
	St. Bernardine Medical Center	233	100.00%
	St. Mary Medical Center - Apple Valley	63	100.00%
	Temecula Valley Hospital	168	99.40%
Orange County	AHMC Anaheim Regional Medical Center	99	100.00%
	Fountain Valley Regional Hospital and Medical Center - Euclid	101	97.03%
	Hoag Memorial Hospital Presbyterian	164	100.00%
	Memorialcare Orange Coast Medical Center	118	100.00%
	Memorialcare Saddleback Medical Center	60	100.00%
	Orange County Global Medical Center	54	100.00%
	Providence Mission Hospital	83	100.00%
	Providence St. Joseph Hospital	133	100.00%
	Providence St. Jude Medical Center	104	100.00%
	UC Irvine Medical Center	108	100.00%
	West Anaheim Medical Center	23	95.65%
Greater San Diego	Grossmont Hospital	91	100.00%
	Palomar Medical Center	55	100.00%
	Scripps Memorial Hospital - La Jolla	362	100.00%
	Scripps Mercy Hospital	52	100.00%
	Sharp Chula Vista Medical Center	124	98.39%
	Sharp Memorial Hospital	81	100.00%
	Tri-City Medical Center	46	97.83%
	UC San Diego Health La Jolla - Jacobs Medical Center & Sulpizio Cardiovascular Center	185	99.46%

Appendix F: Definition of Terms

All CABG Cases: The total number of isolated and non-isolated CABG cases submitted to CCORP. To improve statistical reliability, some measures combine data from two years.

Hospital Operative Mortality for isolated CABG: 2024
Hospital Operative Mortality for CABG + Valve: 2023−2024
Hospital Post-Operative Stroke: 2023−2024
Hospital 30-Day Hospital Readmission: 2023−2024

Isolated CABG Cases: The number of isolated CABG cases submitted to CCORP during the time period indicated for the outcome listed above. All patients in salvage operative status are excluded from the isolated CABG cases, thus only isolated CABG cases without salvage operative status are used to calculate performance ratings.

CABG + Valve Cases: The number of CABG cases performed that included aortic valve replacement, mitral valve repair or replacement or a combination thereof.

Isolated CABG Outcomes:

Operative Mortality (hospital): The number of operative deaths for isolated CABG cases for 2024. The number of deaths includes 1) all deaths that occur during the hospitalization in which the CABG surgery was performed up to 90 days; and 2) all deaths after transfer to another acute care center up to 90 days, and 3) any deaths within 30 days after the surgery (no matter where they occurred).

Post-Operative Stroke: The number of post-operative strokes that were unresolved after 24 hours for isolated CABG cases for 2023−2024 data.

30-Day Readmission: (for Isolated CABG Cases Discharged Alive where the patient could be followed via HCAI's hospital Patient Discharge Data (PDD) file. Patients in salvage operative status, patients who were transferred to acute care, or patients who left against medical advice were excluded). The number of hospital readmissions within 30 days of being discharged from the hospital where an isolated CABG operation was performed, irrespective of the hospital to which they were readmitted for 2023−2024. All-cause unplanned readmissions that occur within 30 days of discharge to the hospital that performed the initial CABG surgery are considered an outcome. Readmission was attributed to the hospital performing the initial CABG surgery.

CABG + Valve Outcome:

Operative Mortality: The number of operative deaths for CABG + Valve cases for 2023−2024. CABG + Valve cases are defined as CABG surgery with aortic valve replacement, mitral valve repair or replacement or a combination thereof. The number of deaths includes 1) all deaths that occur during the hospitalization in which the CABG surgery was performed up to 90 days; and 2) all deaths after

transfer to another acute care center up to 90 days, and 3) any deaths within 30 days after the surgery (no matter where they occurred).

Observed CABG Outcome Rate:
Observed Isolated CABG Mortality Rate The ratio of observed number of isolated CABG operative mortality deaths to number of isolated CABG cases multiplied by 100.
Observed CABG + Valve Mortality Rate The ratio of observed number of CABG + Valve operative mortality deaths to number of CABG + Valve cases multiplied by 100:
Observed Post-Operative Stroke Rate The ratio of observed number of post-operative strokes to number of isolated CABG cases multiplied by 100.
Observed 30-Day Readmission Rate The ratio of observed number of 30-day readmissions to number of isolated CABG cases multiplied by 100.
Observed CABG Outcome Rate = Observed Outcomes/# of CABG Cases × 100.

Expected CABG Outcome Rate:
Expected Isolated CABG Mortality Rate The ratio of expected number of isolated CABG operative mortality deaths (predicted for a provider after risk adjusting for the provider's patient population) to number of isolated CABG cases multiplied by 100.
Expected CABG + Valve Mortality Rate The ratio of expected number of CABG + Valve operative mortality deaths (predicted for a provider after risk adjusting for the provider's patient population) to number of CABG + Valve cases multiplied by 100.
Expected Post-Operative Stroke Rate The ratio of expected number of post-operative strokes (predicted for a provider after risk adjusting for the provider's patient population) to number of isolated CABG cases multiplied by 100.
Expected 30-Day Readmission Rate The ratio of the expected number of 30-day readmissions (predicted for a provider after risk adjusting for the provider's patient population) to number of isolated CABG cases multiplied by 100.
Expected CABG Outcome Rate = Expected Outcomes/# of CABG Cases × 100.

Risk-Adjusted Outcome Rate (95% CI): The risk-adjusted mortality rate (RAMR) is calculated by multiplying the California state average CABG mortality rate by the provider's relevant Observed/Expected ratio. The 95% confidence interval was estimated for the risk-adjusted rate. The lower and upper confidence limits are calculated using Poisson exact confidence interval calculations.

The risk-adjusted post-operative stroke rate (RASR) is calculated by multiplying the California state average CABG post-operative stroke rate by the provider's relevant Observed/Expected ratio. The 95% confidence interval was estimated for the risk-adjusted rate. The lower and upper confidence limits are calculated using Poisson exact confidence interval calculations.

The risk-adjusted 30-day readmission rate (RARR) is obtained by multiplying the California state average CABG 30-day readmission rate by the provider's relevant Observed/Expected ratio. The 95% confidence interval was estimated for the risk-adjusted rate. 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 outcome rate and the California observed outcome rate. This is a test of statistical significance. A provider is classified as **"Better"** if the upper 95% confidence limit of its rate falls below the California observed rate. A provider is classified as **"Worse"** if the lower 95% confidence limit of its outcome rate is higher than the California observed rate. A provider is classified as **"Average"** if the California outcome rate falls within the confidence interval of the provider's risk-adjusted outcome rate.

Appendix G: Acknowledgments

The California Cardiovascular Outcomes Reporting Program (CCORP) is funded by Department of Health Care Access and Information's California Health Data and Planning Fund.

This report represents the contributions of many individuals. 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, and members of the CCORP Clinical Advisory Panel provided oversight and policy guidance for data collection and analysis. HCAI's Healthcare Analytics Branch provided expertise in report concept, editing, and design. The CDPH provided vital statistics files needed for identifying post-surgery deaths after discharge. CCORP also benefited from collaboration with the STS and its California Chapter to coordinate and improve data quality.

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