The California Report on Coronary Artery Bypass Graft (CABG) Surgery 2015: Hospital Data

Coronary artery bypass graft (CABG) surgery is one of the most expensive and common cardiac surgeries performed in California. Improved medical interventions and quality improvement efforts have contributed to a declining mortality rate over the last 15 years. However, post-operative death and major complications (e.g. stroke, surgical site infections) still occur at rates that can and should be reduced. The intent of this report is to help improve quality outcomes and appropriateness of CABG surgery by informing consumers, hospitals, surgeons, and others about the performance of hospitals.

The California Report on Coronary Artery Bypass Graft (CABG) Surgery 2015: Hospital Data provides quality ratings for the 126 California-licensed hospitals performing adult isolated CABG\(^1\) or CABG + Valve\(^2\) surgery during 2015. Hospital results for isolated CABG operative mortality and internal mammary artery (IMA)\(^3\) utilization are based on calendar year 2015 data. Hospital results for isolated-CABG post-operative stroke, isolated-CABG readmission, and CABG + Valve operative mortality are based on combined 2014-2015 calendar year data to increase statistical reliability. The outcome measures are risk-adjusted, a statistical technique that enables fair comparison of hospitals even though some treat sicker patients.

- **Isolated CABG operative mortality** includes all deaths that occurred during the hospitalization, up to 90 days, in which the CABG surgery was performed, or all deaths after transfer to another acute care center up to 90 days and any deaths within 30 days after the surgery (no matter where they occurred). This is a revised definition for this report. Readers should exercise caution when comparing operative mortality rates in this report to those in previous years.

- **CABG + Valve operative mortality** includes all deaths as defined above.

- **Post-operative stroke** is defined as a central neurologic deficit that occurred after the surgery and did not resolve within 24 hours. This measure only applies to isolated CABG surgeries.

- **Hospital readmission** only includes patients who were readmitted (to any hospital) within 30 days of being discharged from the operating hospital with a condition related to the CABG surgery. This measure only applies to isolated CABG surgeries.

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\(^1\) Isolated CABG surgery refers to heart bypass surgery without other major surgery, such as heart or lung transplantation, valve repair, etc. performed concurrently with the bypass procedure. Patients undergoing CPR en route to the operating room are excluded.

\(^2\) CABG + Valve surgery refers to heart bypass surgery that also includes repair or replacement of the mitral valve and/or aortic valve. Patients with salvage operative status are excluded.

\(^3\) The internal mammary artery (IMA) supplies blood to the front chest wall and the breasts. It is a paired artery, running on each side of the inner chest. Evidence shows that the IMA, when grafted to a coronary artery, is less susceptible to obstruction over time and remains fully open longer than vein grafts.
Also included in this report is the IMA utilization rate for hospitals. Research shows that high rates of IMA use result in long-term graft patency and improved patient survival, making it an important process measure of surgical quality.\(^4\)

The California Cardiac Outcomes Reporting Program (CCROP) provided each hospital with a preliminary report containing the risk-adjusted models, explanatory materials, and results for all hospitals. Hospitals were given a 60-day review period to submit statements to CCROP for inclusion in this report. One hospital submitted a comment letter, which can be viewed by clicking the hospital name with * in this report\(^5\). These statements may help readers understand the concerns of healthcare providers regarding their performance information.

**Hospital Operative Mortality Findings**

**2015 Isolated CABG Operative Mortality**

The operative mortality rate for isolated CABG surgery in California was 2.50 percent (313 deaths after 12,498 procedures) in 2015. This rate is higher than the rates reported in 2014 (1.97 percent) and 2013 (2.29 percent)\(^6\). Overall, the 2015 rate represents a 14.09 percent reduction in mortality since 2003 (2.91 percent), the first year of public reporting for all California hospitals.

- After adjusting for patients’ pre-operative health conditions, 96.03 percent of all hospitals performed within the statistically acceptable range of the state average, which is higher than 93.39 percent in 2003, and one hospital, Mercy General Hospital, was rated “Better”.
- After adjusting for patients’ pre-operative health conditions, four hospitals were rated “Worse” than the state average operative mortality rate (Bakersfield Heart Hospital, Desert Regional Medical Center, Rideout Memorial Hospital, and St. Bernadine Medical Center). Desert Regional Medical Center was also rated “Worse” than the state average for 2014.

**2014-2015 CABG + Valve Operative Mortality**

The operative mortality rate for CABG + Valve surgery in California was 5.42 percent in 2014-2015 (274 deaths after 5,058 procedures)\(^6\). This rate decreased by 3.04 percent—a slight reduction from 5.59 percent in 2013-2014.

- After adjusting for patients’ pre-operative health conditions, two hospitals were rated “Better” than the state average operative mortality rate: Scripps Memorial Hospital – La Jolla and Sequoia Hospital. Both retained the “Better” rating for two years in a row and Scripps Memorial Hospital – La Jolla maintained the “Better” rating for the last three years in a row.

\(^4\) IMA utilization was assessed only for first-time, isolated CABG surgeries where the operative status was elective or urgent and the left anterior artery was bypassed.

\(^5\) A statement from North Bay Medical Center is available [here](#).

\(^6\) The operative mortality definition change for 2015 resulted in a minor (less than 0.03 percent) mortality rate increase for all areas where this definition was used.
After adjusting for patients’ pre-operative health conditions, four hospitals were rated “Worse” than the state average operative mortality rate (Desert Regional Medical Center, Fountain Valley Regional Hospital and Medical Center – Euclid, North Bay Medical Center5, and St. John’s Regional Medical Center).

2014-2015 Hospital Post-Operative Stroke Findings

The post-operative stroke rate for isolated CABG surgery in California was 1.31 percent (323 strokes after 24,727 procedures) in 2014-2015, which is a slight change from 1.28 percent in 2013-2014. This represents an 8.39 percent decrease in California’s average post-operative stroke rate since 2007-2008 when the rate was 1.43 percent.

- After adjusting for patients’ pre-operative health conditions, one hospital was rated “Better” than the state average post-operative stroke rate (Scripps Memorial Hospital – La Jolla).

- Three hospitals were rated “Worse” than the state average post-operative stroke rate (Salinas Valley Memorial Hospital, Seton Medical Center, and St. John’s Regional Medical Center).

2014-2015 Hospital Readmission Findings

The hospital 30-day readmission rate was 11.50 percent (2,494 readmissions out of 21,680 patients) for patients who underwent isolated CABG surgery in 2014-2015, were discharged alive, and could be followed-up via hospital patient discharge data.

- After adjusting for patients’ pre-operative health conditions, five hospitals (Kaiser Foundation Hospital – San Francisco, Kaiser Foundation Hospital – Santa Clara, Mercy General Hospital, Santa Barbara Cottage Hospital, and UC San Diego Health - Sulpizio Cardiovascular Center) were rated “Better” than the state average.

- Eight hospitals were rated “Worse” than the state average (Bakersfield Heart Hospital, California Hospital Medical Center – Los Angeles, Community Regional Medical Center – Fresno, Glendale Adventist Medical Center – Wilson Terrace, Hollywood Presbyterian Medical Center, Ronald Reagan UCLA Medical Center, St. Francis Medical Center, and Valley Presbyterian Hospital).

2015 Hospital Internal Mammary Artery (IMA) Usage Findings

- The IMA is the preferred conduit for CABG surgery of the left anterior descending artery. Hospitals with high rates of IMA usage are adhering to nationally recognized best practices in heart bypass surgery. There is no consensus on an optimal usage rate, so “Better” performance ratings are not given. The average IMA usage rate among California hospitals was 97.49 percent in 2015, 97.10 percent in 2014, 96.60 percent in 2013, as compared with 89.56 percent7 in 2003.

7 The increase in the statewide IMA usage rate over the last 10 years is partly due to a change in the IMA measure. Beginning in 2008, patients who did not have the left anterior descending artery bypassed were excluded from the denominator.
Four of 126 California hospitals (Antelope Valley Hospital, Bakersfield Heart Hospital, Palmdale Regional Medical Center, and St. Francis Medical Center) were rated “Low” with IMA usage rates significantly lower than the state average. Two of these hospitals have had low IMA usage rates prior to 2015: Antelope Valley Hospital was rated “Low” from 2008 to 2010 and 2012 to 2014 and Palmdale Regional Medical Center was rated “Low” in 2013 and 2014.

For detailed results by hospital, please see California Hospital Performance Ratings for Coronary Artery Bypass Graft (CABG) Surgery by Region, 2015. For information on research methods and statistical results, please see the Technical Note for the California Report on Coronary Artery Bypass Graft Surgery 2015: Hospital Data.