

OSHPD Technical Note
for Producing
Ischemic Stroke:
Hospital Outcomes in
California, 2013-2014

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The stroke mortality risk model used in this report was developed through a multi-step process that included conducting a literature review, convening an expert panel, selecting candidate outcome measures, defining the study cohort, selecting risk factors for the risk model, estimating and testing statistical models, and calculating outcome measures. The details of this process are described in the report “Ischemic Stroke Outcomes Validation Study in California, 2006-2009,” which is available on the Office of Statewide Health Planning and Development (OSHPD) website: <http://www.oshpd.ca.gov>. In this technical note, OSHPD summarizes the key information regarding data sources, selection of hospitals and patients, the mortality measure and risk factors, the readmission measure and risk factors, patient demographic characteristics, risk model performance, and limitations of the methods.

Data Sources

The primary data source for this report was the California Patient Discharge Data (PDD) collected by OSHPD. For this report, stroke patients were selected from 2013 and 2014 PDD files. To identify deaths that occurred after discharge, the PDD was matched to 2013 and 2014 California death certificate records (Death Statistical Master File) obtained from the California Department of Public Health, using patients’ Social Security number as the common identifier in both datasets.

Selection of Hospitals

A total of 324 acute care hospitals reporting patient discharge data to OSHPD were eligible for inclusion. In cases of hospital consolidation, name change, and change of address, the discharges were attributed to the name of the hospital that was in effect at the time services were provided. Fifty hospitals were excluded from performance reporting because they treated a small number of ischemic stroke cases. Low-volume hospitals were excluded because their risk-adjusted rates are inherently unreliable, and the purpose of the report was to evaluate differences in diagnosis, severity of illness, and treatment across hospital strata defined by risk-adjusted rates. OSHPD used 30 cases as a cutoff for exclusion. Table 1 shows these hospitals with fewer than 30 ischemic stroke admissions during 2013 - 2014. A total of 598 ischemic stroke patients were reported from excluded hospitals during the time period, with 72 deaths and 70 readmissions. The small number of cases resulted in risk-adjusted rates with extremely wide confidence intervals that could not be meaningfully interpreted; therefore, risk-adjusted outcome rates and performance ratings are not provided for these hospitals.

Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2013-2014

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
Alameda	Kaiser Foundation Hospital – Fremont	25	3	0
Butte	Biggs Gridley Memorial Hospital	13	5	4
Colusa	Colusa Regional Medical Center	13	1	0

Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2013-2014

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
El Dorado	Barton Memorial Hospital	25	2	1
Fresno	Adventist Medical Center – Reedley	26	5	0
Fresno	Coalinga Regional Medical Center	8	2	0
Fresno	Fresno Heart and Surgical Hospital	4	0	0
Glenn	Glenn Medical Center	2	0	0
Inyo	Northern Inyo Hospital	19	4	2
Inyo	Southern Inyo Hospital	2	0	0
Kern	Delano Regional Medical Center	15	1	3
Kern	Kern Valley Healthcare District	12	3	0
Kern	Tehachapi Hospital	1	0	0
Lake	Saint Helena Hospital – Clearlake	7	1	1
Lassen	Banner Lassen Medical Center	8	1	0
Los Angeles	Coast Plaza Hospital	23	3	3
Los Angeles	East Los Angeles Doctors Hospital	24	2	1
Los Angeles	Gardens Regional Hospital and Medical Center	22	0	4
Los Angeles	Glendora Community Hospital	22	2	6
Los Angeles	Greater El Monte Community Hospital	26	0	5
Los Angeles	Hollywood Community Hospital	14	1	3
Los Angeles	Los Angeles Metropolitan Medical Center	1	0	1

Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2013-2014

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
Los Angeles	Motion Picture and Television Hospital	2	0	0
Los Angeles	Norwalk Community Hospital	29	0	2
Los Angeles	Silver Lake Medical Center – Downtown Campus	23	1	4
Mariposa	John C. Fremont Healthcare District	5	1	0
Merced	Memorial Hospital Los Banos	8	4	0
Modoc	Modoc Medical Center	5	1	0
Mono	Mammoth Hospital	4	0	0
Monterey	George L. Mee Memorial Hospital	4	0	0
Nevada	Tahoe Forest Hospital	11	0	0
Orange	Anaheim General Hospital	3	0	1
Orange	Chapman Medical Center	19	2	4
Orange	Coastal Communities Hospital	22	0	1
Orange	Mission Hospital Laguna Beach	3	1	2
Orange	Western Medical Center – Anaheim	13	0	0
Plumas	Eastern Plumas Hospital – Portola Campus	2	2	0
Plumas	Plumas District Hospital	5	1	0
Plumas	Seneca Healthcare District	5	1	0
Riverside	Palo Verde Hospital	11	1	3
San Bernardino	Bear Valley Community Hospital	1	1	0
San Bernardino	Colorado River Medical Center	3	0	0

Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2013-2014

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
San Bernardino	Montclair Hospital Medical Center	21	3	1
San Diego	Fallbrook Hospital District	19	2	3
Santa Barbara	Goleta Valley Cottage Hospital	7	3	0
Santa Barbara	Santa Ynez Valley Cottage Hospital	12	5	0
Shasta	Mayers Memorial Hospital	4	1	0
Sonoma	Sutter Santa Rosa Regional Hospital	10	0	0
Trinity	Trinity Hospital	6	3	1
Ventura	Ojai Valley Community Hospital	29	3	1

Selection of Patients

Patients were selected for this analysis if these inclusion and exclusion criteria were met:

Inclusion Criteria

- Admission date between January 1, 2013 and December 31, 2014
- Age at admission of 18 years and older
- Principal ICD-9-CM diagnosis code for ischemic stroke (Table 2)

Table 2. Ischemic Stroke Diagnoses Included in the Analysis

ICD-9-CM Code	ICD-9-CM Description
433.01	Occlusion and stenosis of basilar artery with cerebral infarction
433.11	Occlusion and stenosis of carotid artery with cerebral infarction
433.21	Occlusion and stenosis of vertebral artery with cerebral infarction
433.31	Occlusion and stenosis of multiple and bilateral precerebral arteries with cerebral infarction
433.81	Occlusion and stenosis of other specified precerebral artery with cerebral infarction
433.91	Occlusion and stenosis of unspecified precerebral artery with cerebral infarction
434.00	Cerebral thrombosis without mention of cerebral infarction
434.01	Cerebral thrombosis with cerebral infarction
434.11	Cerebral embolism with cerebral infarction
434.91	Cerebral artery occlusion unspecified with cerebral infarction
436	Acute, but ill-defined, cerebrovascular disease

Exclusion Criteria

- Principal ICD-9-CM diagnosis code for hemorrhagic stroke (ICD-9 codes 430, 431, and 432)
- Evidence of prior ischemic stroke or hemorrhagic stroke within 180 days of the stroke admission
- Transfer from within the hospital or from another acute care hospital (hospital-to-hospital transfer)
- Treatment at a hospital other than a general acute care hospital [i.e., hospitals without emergency rooms, children’s hospitals, and long-term acute care facilities]

Outcome Measures

OSHPD measured the quality of hospital care provided by calculating hospital 30-day all-cause risk-adjusted mortality rates (RAMR) and 30-day all-cause risk-adjusted readmission rates (RARR) for patients with ischemic stroke.

The Hospital 30-day RAMR includes deaths from any cause within 30 days of the index stroke admission. It was chosen as the central outcome for this report because it is a reliable, well-defined, and easily validated performance measure. Use of 30-day mortality versus inpatient mortality is preferred for two reasons: 1) 30 days is a more consistent time frame because length of hospital stay varies across patients and types of hospitals, and 2) hospitals cannot “game” their outcomes by discharging patients who might die in the hospital prior to the 30-day mark. Deaths occurring beyond 30 days are not included because they are less likely to be related to the care received in the hospital. Dates of death were determined by linking the PDD to California death certificate records using Social Security numbers.

The Hospital 30-day RARR includes readmissions for any cause to any acute care hospital within 30 days of being discharged alive after treatment for ischemic stroke. Patients who were transferred from one hospital to another during the acute stroke episode are not considered to have been readmitted. This outcome is considered both a measure of hospital quality and a marker of resource utilization. Within the 30-day time frame, readmissions are often due to the care received during the index hospitalization and the subsequent transition to the outpatient setting.

Readmissions are costly to the healthcare system and are burdensome to patients and their caregivers. Measuring and reporting readmission rates across hospitals can reveal opportunities for quality improvement and reducing costs in the healthcare system. Hospitals may be able to lower readmission rates by both improving patient care and better planning for patients' needs once they leave the hospital. Similar mortality and readmission measures have been used by the Centers for Medicare and Medicaid Services (CMS) to modify hospital payments based on performance.

How the Outcomes were Measured

OSHPD used a multivariable logistic regression model to determine the relationship between each of the risk factors and the probability of 30-day mortality or 30-day readmission while controlling for all other risk factors in the model.

Risk-adjustment: To make fair comparisons among different hospitals, the 30-day mortality and 30-day readmission rates were adjusted for risk factors including patient demographics, source of admission, stroke severity, and comorbidities that are known to influence the patient's risk of death or readmission. Hospitals with higher-risk patients are more likely to have higher death and readmission rates than hospitals with lower-risk patients, even when the medical care given is appropriate. Therefore, it is necessary to adjust for differences in the severity of patient illness across hospitals. Hospitals with more complex cases receive a larger risk-adjustment weight in the risk model than those hospitals with less complex cases. Thus, hospitals treating sicker patients are not at a disadvantage when their performance is compared with other hospitals.

Validation: Before developing the model, OSHPD contracted with the University of California, Los Angeles to conduct the validation study, "Ischemic Stroke Outcomes Validation Study in California, 2006-2009," (www.oshpd.ca.gov) to determine whether existing data elements in the PDD could be used to develop valid measures of ischemic stroke quality. The study found that a risk-adjusted mortality measure based on the existing data at OSHPD was a feasible, reliable and valid measure of hospital stroke quality. The investigators found that important clinical processes and independent measures of stroke care quality were statistically significantly related to this patient outcome. Establishing the process-outcome link is important towards validating the outcome measures as reflective of the care provided. This is especially important in the stroke domain, where some stroke injury and sequela may be reversed by utilizing standard processes of care immediately following a stroke.

Risk Factors for Ischemic Stroke Outcomes: Risk factors, including patient demographics, hospitalization characteristics, stroke severity and comorbidities, were selected for the

ischemic stroke model. Risk factors that appeared not to significantly lower the risk of death or readmission were eliminated from further analysis unless prior literature or clinical experience suggested a reason for this relationship.

Patient Demographic and Hospitalization Characteristics

During 2013 to 2014, slightly more women (50.43%) than men (49.57%) were admitted for ischemic strokes. Most patients were White non-Hispanic (55.66%) followed by Hispanic (19.79%), Asian/Pacific Islander (10.83%), and Black (9.97%). Ischemic strokes occur most often in adults 65 years of age and older, who accounted for 69.69% of ischemic stroke patients. About 67.06% of the ischemic stroke patients' hospital care was paid by Medicare while 11.51% was paid for Medi-Cal patients, which was an increase of 26.48% in the 2013-14 report as compared with the 2012-13 report (Table 3).

Table 3. Demographic Characteristics of Ischemic Stroke Patients

	Number	Percent (%)
Statewide	73,982	
SEX		
Male	36,673	49.57
Female	37,309	50.43
AGE GROUP		
18-44	2,622	3.54
45-64	19,804	26.77
65+	51,556	69.69
RACE/ETHNICITY		
White	41,180	55.66
Black	7,378	9.97
Hispanic	14,638	19.79
Asian/Pacific Islander	8,009	10.83
Other	2,777	3.75
EXPECTED PAYER		
Medicare	49,614	67.06
Medi-Cal	8,513	11.51
Private	11,874	16.05
Self Pay	1,930	2.61
Other	2,042	2.76

Risk-Adjustment Models

Table 4 shows the parameter estimates, odds ratios (ORs), and confidence intervals (CIs) for the risk factors in the 2013-2014 ischemic stroke 30-day mortality model. The strongest predictors of death were: cardiopulmonary arrest (OR=6.990), diagnosis of metastatic cancer (OR=6.524), decreased consciousness/altered mental status/coma (OR=4.432), and conjugate deviation of eyes (OR=2.714). Several conditions (e.g., hypertension, apraxia, other paralysis, current smoker, former TIA) that clinically would be expected to increase the risk of death, were associated with a lower risk of mortality. Many of the counterintuitive findings seen in this analysis are likely explained by prior studies that found coding bias primarily responsible—patients who are severely ill and in the process of dying will have more severe acute conditions or complications that take precedence in coding over chronic diseases¹.

¹ Iezzoni LI, Foley SM, Daley J, Hughes J, Fisher ES, Heeren T. Comorbidities, complications, and coding bias. Does the number of diagnosis codes matter in predicting in-hospital mortality? *JAMA* 1992; 267:2197-203.

Table 4. Parameters for 30-Day Mortality Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Intercept	-7.465	0.123	<.0001		
Age (Years)	0.057	0.001	<.0001	1.058	1.055-1.061
Male	-0.019	0.029	0.526	0.982	0.926-1.040
Black	-0.531	0.060	<.0001	0.588	0.523-0.661
Hispanic	-0.224	0.040	<.0001	0.799	0.739-0.864
Asian	-0.393	0.049	<.0001	0.675	0.613-0.743
Other Race/Ethnicity	-0.169	0.076	0.026	0.845	0.728-0.980
Emergency Department (ED) Transfer	0.237	0.066	0.000	1.268	1.114-1.444
Hospital - Hospital (HH) Transfer	0.128	0.067	0.057	1.137	0.996-1.297
ED + HH Transfer	0.018	0.264	0.946	1.018	0.607-1.706
Source of Admission - Skilled Nursing	0.617	0.047	<.0001	1.852	1.689-2.032
Source of Admission - Other	0.056	0.084	0.501	1.058	0.898-1.247
Aphasia	0.199	0.031	<.0001	1.220	1.147-1.298
Hemiplegia/Hemiparesis	0.197	0.040	<.0001	1.218	1.126-1.318
Other Paralysis	-0.281	0.139	0.043	0.755	0.575-0.991
Hemineglect	-0.075	0.102	0.463	0.928	0.759-1.134
Vision Loss	-0.183	0.077	0.017	0.833	0.717-0.968
Apraxia	-1.221	0.288	<.0001	0.295	0.168-0.518
Decreased Consciousness, Altered Mental Status, Coma	1.489	0.052	<.0001	4.432	4.005-4.903

Table 4. Parameters for 30-Day Mortality Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Seizure or Seizure Disorder	0.389	0.055	<.0001	1.475	1.326-1.641
Conjugate Deviation of Eyes	0.999	0.322	0.002	2.714	1.444-5.102
Other Cerebral Ischemic Signs or Symptoms	-0.344	0.106	0.001	0.709	0.576-0.872
Perenteral Nutrition	0.335	0.191	0.080	1.398	0.961-2.032
Dysphagia	0.212	0.035	<.0001	1.237	1.156-1.323
Admission Elevated Glucose	-0.091	0.082	0.271	0.913	0.777-1.073
Acute Myocardial Infarction	0.790	0.076	<.0001	2.204	1.898-2.559
Left-sided Valvular Heart Disease	0.004	0.109	0.967	1.004	0.812-1.243
Right-sided Valvular Heart Disease	-0.387	0.100	0.000	0.679	0.558-0.826
Atrial Fibrillation	0.497	0.030	<.0001	1.644	1.551-1.743
Cardiopulmonary Arrest	1.945	0.055	<.0001	6.990	6.271-7.792
Systolic Heart Failure	-0.997	0.636	0.117	0.369	0.106-1.284
History of CHF (Left Heart Failure, Cardiomyopathy)	0.284	0.035	<.0001	1.329	1.242-1.422
Any Ischemic Heart Disease: CAD, Angina, AMI, prior MI	-0.026	0.033	0.434	0.975	0.914-1.040
Dementia or Alzheimer's Disease	0.256	0.048	<.0001	1.291	1.176-1.418
Low Platelet Count	0.237	0.168	0.157	1.268	0.912-1.762
Bleeding Disorders (no platelet disorders)	0.809	0.170	<.0001	2.246	1.610-3.133
Anticoagulation*	-10.176				
Hypercoagulable State	0.311	0.135	0.021	1.365	1.048-1.779

Table 4. Parameters for 30-Day Mortality Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Falls	-0.106	0.064	0.098	0.900	0.794-1.020
Current Smoker	-0.098	0.039	0.013	0.907	0.840-0.979
Recurrent Strokes	0.304	0.050	<.0001	1.355	1.230-1.494
Former TIA	-0.234	0.091	0.010	0.791	0.663-0.945
TIA Resolved	0.127	0.045	0.005	1.136	1.040-1.240
Fever 48 h	0.468	0.129	0.000	1.596	1.241-2.053
Pulmonary Circulation Disease	0.112	0.067	0.097	1.118	0.980-1.276
Peripheral Vascular Disease	-0.032	0.039	0.415	0.968	0.897-1.046
Hypertension	-0.104	0.036	0.004	0.901	0.839-0.967
Paralysis	0.876	0.044	<.0001	2.402	2.202-2.620
Chronic Pulmonary Disease	-0.014	0.039	0.725	0.986	0.914-1.065
Diabetes w/o Chronic Complications	0.069	0.035	0.048	1.071	1.001-1.146
Diabetes w/ Chronic Complications	0.025	0.051	0.631	1.025	0.927-1.133
Renal Failure	0.182	0.036	<.0001	1.199	1.118-1.285
Liver Disease	0.325	0.106	0.002	1.384	1.124-1.704
Chronic Peptic Ulcer Disease	-0.492	0.774	0.525	0.611	0.134-2.789
Acquired Immune Deficiency Syndrome	-0.195	0.842	0.817	0.823	0.158-4.289
Lymphoma	0.646	0.169	0.000	1.909	1.371-2.657
Metastatic Cancer	1.876	0.080	<.0001	6.524	5.574-7.636

Table 4. Parameters for 30-Day Mortality Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Solid Tumor w/out Metastasis	0.633	0.085	<.0001	1.883	1.595-2.223
Rheumatoid Arthritis/Collagen Vas	0.037	0.084	0.662	1.038	0.879-1.224
Weight Loss	0.376	0.059	<.0001	1.457	1.297-1.636
Fluid and Electrolyte Disorders	0.316	0.034	<.0001	1.371	1.284-1.465
Chronic Blood Loss Anemia	0.082	0.195	0.676	1.085	0.740-1.591
Deficiency Anemia	-0.032	0.037	0.391	0.969	0.900-1.042
Alcohol Abuse	-0.127	0.083	0.127	0.880	0.748-1.037
Drug Abuse	0.341	0.102	0.001	1.406	1.152-1.717
Psychoses	-0.104	0.071	0.142	0.901	0.784-1.035

*Parameters could not be estimated accurately since all two patients with condition survived.

Table 5 shows the parameter estimates, ORs, and CIs for the risk factors in the 2013-2014 ischemic stroke 30-day readmissions model. The strongest predictors of 30-day readmissions were: diagnosis of Liver Disease (OR=1.602), Metastatic Cancer (OR=1.583), Chronic Blood Loss Anemia (OR=1.496), Hospital-Hospital (HH) transfer (OR=1.456) and Deficiency Anemia (OR=1.426).

Table 5. Parameters for Readmission Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Intercept	-2.602	0.071	<.0001		
Age (Years)	0.000	0.001	0.882	1.000	0.998-1.002
Black	0.149	0.040	0.000	1.161	1.074-1.255
Hispanic	0.050	0.032	0.123	1.051	0.987-1.119
Asian	0.080	0.040	0.044	1.083	1.002-1.171
Hospital – Hospital Transfer	0.376	0.055	<.0001	1.456	1.307-1.622
ED + HH Transfer	0.240	0.207	0.246	1.271	0.848-1.907
Hemineglect	0.010	0.109	0.925	1.010	0.816-1.251
Vision Loss	0.054	0.065	0.407	1.055	0.929-1.198
Seizure or Seizure Disorder	0.176	0.050	0.000	1.192	1.081-1.315
Perenteral Nutrition	0.210	0.216	0.332	1.233	0.808-1.884
Dysphagia	0.204	0.034	<.0001	1.226	1.148-1.309
Acute Myocardial Infarction	0.260	0.081	0.001	1.297	1.107-1.519
Cardiopulmonary Arrest	0.290	0.080	0.000	1.337	1.143-1.563
History of CHF (L Heart Failure, Cardiomyopathy)	0.191	0.033	<.0001	1.211	1.136-1.290
Any Ischemic Heart Disease: CAD, Angina, AMI, prior MI	0.185	0.029	<.0001	1.203	1.137-1.273
Bleeding Disorders (no platelet disorders)	0.194	0.189	0.305	1.214	0.838-1.759
Recurrent Strokes	0.246	0.043	<.0001	1.279	1.175-1.392
TIA Resolved	0.259	0.039	<.0001	1.296	1.200-1.399
Fever 48 hr	0.216	0.129	0.095	1.241	0.963-1.598

Table 5. Parameters for Readmission Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Pulmonary Circulation Disease	0.073	0.067	0.273	1.076	0.944-1.227
Peripheral Vascular Disease	0.103	0.035	0.003	1.108	1.035-1.187
Hypertension	0.069	0.032	0.029	1.072	1.007-1.141
Paralysis	0.218	0.034	<.0001	1.244	1.165-1.329
Chronic Pulmonary Disease	0.116	0.034	0.001	1.123	1.050-1.200
Diabetes w/o Chronic Complications	0.154	0.029	<.0001	1.167	1.103-1.235
Diabetes w/ Chronic Complications	0.226	0.040	<.0001	1.254	1.160-1.355
Renal Failure	0.279	0.032	<.0001	1.322	1.242-1.407
Liver Disease	0.471	0.077	<.0001	1.602	1.379-1.862
Metastatic Cancer	0.459	0.093	<.0001	1.583	1.319-1.898
Solid Tumor w/o Metastasis	0.307	0.086	0.000	1.360	1.148-1.610
Weight Loss	0.241	0.060	<.0001	1.272	1.131-1.431
Fluid and Electrolyte Disorders	0.189	0.031	<.0001	1.207	1.136-1.284
Chronic Blood Loss Anemia	0.403	0.176	0.022	1.496	1.059-2.113
Deficiency Anemia	0.355	0.032	<.0001	1.426	1.340-1.518
Psychoses	0.018	0.058	0.764	1.018	0.908-1.141

Risk Model Performance

For each logistic regression model, OSHPD computed summary statistics to assess model performance: model evaluation, goodness of fit, discrimination, and calibration.

Discrimination: 30-day mortality/30-day readmission

Risk models that distinguish well between patients who have an adverse event and those who do not are said to have good discrimination. A commonly used measure of discrimination is the C-statistic, also known as the area under the Receiver Operating Characteristic (ROC) curve. For all possible pairs of patients, where one has a 30-day death or a 30-day readmission and the other does not, the C-statistic describes the proportion of pairs where the patient with the event had a higher predicted risk of the event than the patient without the event. C-statistics range from 0.5 to 1, with higher values indicating better discrimination. For the 2013-2014 mortality risk model, the C-statistic was 0.84, which is generally considered excellent model discrimination. For the readmission risk model, the C-statistic was 0.63, indicating that the readmissions model was much less accurate than the mortality model in predicting which patients had the event. However, readmissions are more difficult to predict than outcomes like mortality or complications, and this C-statistic is typical of those found in the health services literature.

Calibration: 30-day mortality/30-day readmission

Calibration refers to the ability of a risk model to match predicted and observed outcomes (e.g., deaths and readmissions). A model in which the number of observed outcomes matches closely with the predicted number of outcomes across different strata of the data demonstrates good calibration. Good calibration is essential for accurate risk adjustment. A common measure of calibration is the Hosmer-Lemeshow χ^2 test, which compares observed and predicted outcomes over deciles of risk. The p-value of the Hosmer-Lemeshow test statistic for this 30-day readmission risk model is <0.001, indicating there were significant differences between observed and predicted outcomes over deciles of risk, indicating poor calibration. That is, predicted readmissions were not consistent with actual readmissions across the data. The finding of poor calibration for risk models based on administrative data is not uncommon, especially when analyses employ large numbers of cases and the test becomes sensitive to small differences between the number of predicted and expected events.

To better understand problems in calibration, the data were partitioned into 10 groups by patient risk, and observed outcomes were compared with predicted outcomes for each of the groups. Table 6 presents these results for the mortality outcome with the lowest risk patients in Risk Group 1 and the highest risk patients in Risk Group 10. Though the model underpredicts mortality for the lower risk groups, the model works well for the higher risk groups, which counts for over 86% of death cases. Table 7 presents the results for the readmission outcome with the lowest risk patients in Risk Group 1 and the highest risk patients in Risk Group 10. Though the model underpredicts readmissions for Risk Group 2, the model works well for the higher risk groups, which counts for over 95% of readmission cases. In fact, 9 of the 10 risk groups have neither significantly fewer nor significantly more readmissions than were predicted by the model. Overall the risk model shows no systematic underestimation or overestimation of death or readmission cases at the extremes.

Table 6. Calibration of Risk Model for 30-Day Mortality, 2013-2014

Risk Group	Ischemic Stroke Cases	Observed Deaths	Predicted Deaths	Difference	95% CI of Predicted Deaths
1	7,397	50	54.96	4.96	(45.68-67.60)
2	7,398	67	105.04	38.04	(88.38-125.60)
3	7,398	107	157.60	50.60	(133.07,187.99)
4	7,398	165	224.57	59.57	(189.77-267.54)
5	7,402	246	314.31	68.31	(266.35-373.09)
6	7,394	357	435.44	78.44	(370.10-514.04)
7	7,398	600	605.71	5.71	(514.57-715.18)
8	7,398	1,038	870.62	-167.38	(740.05-1024.99)
9	7,398	1,604	1,387.15	-216.85	(1,179.69-1,627.02)
10	7,401	3,127	3,208.59	81.59	(2,851.14-3,576.81)
	73,982	7,361	7,364.00	3.00	

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

Table 7. Calibration of Risk Model for 30-Day Readmission, 2013-2014

Risk Group	Ischemic Stroke Cases	Observed Readmissions	Predicted Readmissions	Difference	95% CI of Predicted Readmissions
1	6,804	457	482.47	25.47	(454.01-512.72)
2	6,778	425	512.35	87.35	(476.58-550.85)
3	6,793	581	566.49	-14.51	(522.89-613.73)
4	6,780	588	605.59	17.59	(555.31-660.45)
5	6,789	681	663.59	-17.41	(602.83-730.39)
6	6,789	737	728.77	-8.23	(656.29-809.12)
7	6,789	870	814.47	-55.53	(727.55-911.29)
8	6,789	961	931.42	-29.58	(824.64-1051.05)
9	6,789	1,197	1,122.19	-74.81	(983.02-1,278.76)
10	6,788	1,557	1,627.72	70.72	(1,410.24-1,868.34)
	67,888	8,054	8,055.05	1.05	

Note: Risk Group 1 is at lowest risk for readmissions and Risk Group 10 is at highest risk.

Calculation of Hospital Outcome Measures

30-Day Mortality/Readmission Outcome

The risk-adjusted rate represents the best estimate of what a hospital mortality/readmission rate would have been if the hospital had a patient case mix identical to the statewide average. Thus, this rate is comparable among hospitals because it accounts for the differences in patient severity of illness.

The risk-adjusted rate is computed first by dividing the hospital's observed rate by the hospital's expected rate (obtained from the risk model calculation) to get the observed/expected (O/E) ratio. If the O/E ratio is greater than one, the hospital has a higher mortality rate than expected based on its patient mix. If the O/E ratio is less than one, the hospital has a lower mortality rate than expected. The O/E ratio is then multiplied by the overall state mortality to obtain the hospital's risk-adjusted mortality rate. This results in the 2013-2014 hospital 30-day mortality rate of 9.95% and the 30-day readmission rate of 11.87%. However, because a hospital's point estimate of the risk-adjusted rate can be attributed to chance, this report determines the performance rating not based on a point estimate of the risk-adjusted rate, but based on a comparison of the 98% confidence interval (CI) of each hospital's risk-adjusted rate to the California average rate². As shown in Tables 8 and 9, if the upper 98% CI of a hospital's risk-adjusted rate is below the state average rate, indicating the hospital's risk-adjusted rate is significantly lower than the state average, then the hospital's performance rating is "Better." If the lower 98% CI of a hospital's risk-adjusted rate is above the state average rate, indicating the hospital's risk-adjusted rate is significantly higher than the state average, then the performance rating is "Worse." If the state average rate is within the 98% CI of a hospital's risk-adjusted rate, then the performance rating is "As Expected."

Limitations of the Data and Models

The preferred method to produce hospital outcome reports includes the collection of detailed clinical data to provide accurate risk adjustment. This approach requires medical chart abstraction, which is expensive and time-consuming; consequently, it has not been widely implemented by public reporting agencies. Using health insurance claims or administrative data for public outcomes reporting offers several advantages, including minimal data collection costs and the ability to produce reports for a large number of procedures and conditions. However, most approaches to risk adjustment that rely on administrative data have demonstrated deficiencies that threaten their usefulness as quality assessment tools.

Types of Data Quality Errors: Quality of care is one reason a hospital's mortality/readmission rate may be unusually high or low. However, there are additional factors that may contribute to a hospital's 30-day mortality/readmission rate.

Hospital data errors: Hospitals that failed to report important risk factors or had other data quality problems could have received too little "credit" for their patient risk in the risk-adjustment process. Some facilities have applied for and have been granted "modifications" to standard inpatient data reporting requirements. Other facilities were unable to complete

² Luft HS, Brown BW Jr. Calculating the probability of rare events: Why settle for an approximation? *Health Services Research*. 1993; 28:419-439.

specific fields as required and were deemed “non-compliant” at the time of reporting. OSHPD provides a list of known data errors and their affected variables for facilities with approved modifications and non-compliant facilities (www.oshpd.ca.gov).

Unmeasured risk: Administrative datasets provide limited data, based on ICD-9-CM codes, to characterize patients’ risk of death/readmission. This includes data errors for both known risk factors and unknown risk factors. For known risk factors, unmeasured risk may be in the form of hospitals incorrectly reporting ICD-9-CM codes in the patient discharge data records.

In addition, unknown risk factors not reported in the patient discharge data records may also account for unmeasured patient risk differences not explained by the current model.

Limited outcome measure: This report focuses on two outcome measures: 30-day mortality and 30-day readmission. If a hospital’s risk-adjusted 30-day mortality rate is a valid quality of care indicator, then hospitals with low rates are managing their patients in ways that maximize the likelihood of successful outcomes. These management practices are also known as processes of care, because they describe the process by which nurses, physicians, and other health professionals provide care at the bedside. Other processes of care include functional recovery, health-related quality of life and other clinical outcomes. These measures may be as or more meaningful than the outcomes chosen but would require additional resources to collect and develop.

Other Stroke Quality Measures

AHRQ Inpatient Stroke Mortality Measure

The Agency for Healthcare Research and Quality (AHRQ) has developed an Inpatient Quality Indicator – Acute Stroke Mortality Rate (IQI #17), and OSHPD has publicly reported this as a measure of hospital stroke care since 2006. However, there are several important differences between the AHRQ inpatient mortality measure (Version 5.0) and the OSHPD 30-day mortality measure.

- This outcomes report includes only ischemic stroke patients, while IQI #17 includes all acute stroke cases and breaks them further into three strata: subarachnoid stroke, hemorrhagic stroke and ischemic stroke.
- This report encompasses two years of data, while IQI #17 is reported annually.
- This report includes patients with a primary diagnosis of cerebral thrombosis without mention of cerebral infarction, while IQI #17 excludes those patients.
- This report excludes patients with prior ischemic or hemorrhagic stroke within 180 days of the stroke admission, while IQI #17 does not have the exclusion.
- This report includes all deaths (inside and outside of hospitals) that occur up to 30 days after admission, while IQI #17 includes only inpatient deaths.
- This report uses a risk model based on both clinical logic and empirical considerations, while the IQI #17 risk model is empirically based.
- In this report, a 98% confidence interval is applied to identify hospitals whose performance differs significantly from the state average while the IQI #17 uses a 95% confidence interval to identify hospital outliers.

CMS Stroke Mortality and Readmission Measures

The Centers for Medicare and Medicaid Services (CMS) recently provided the details for two stroke measures: Hospital 30-Day Mortality Following Acute Ischemic Stroke and Hospital 30-Day Readmission Following Acute Ischemic Stroke. One major difference between the OSHPD report and the CMS measures is the risk factors included in the model. In the OSHPD report, both 30-day mortality and readmission models adjusted for stroke severity while the CMS measures did not include stroke severity as a predictive variable. The OSHPD C-statistic for the mortality model is higher than the C-statistic published by CMS (0.84 vs 0.74), while the C-statistic for the OSHPD readmissions model is similar to the CMS model (0.63 vs 0.60).

Results: Risk-Adjusted Outcomes

Risk-adjusted 30-day mortality rates: Among the 73,982 ischemic stroke patients admitted to 324 California hospitals between January 1, 2013 and December 31, 2014, 7,340 patients died within 30 days of the index admission, reflecting an overall statewide 30-day mortality rate of 9.95% (Table 8). The observed 30-day mortality rates at California hospitals ranged from 0% to 23.53%. The expected 30-day mortality rate, calculated by the risk model to reflect patients' demographics and severity of illness, varied between 2.26% and 17.62%. The 30-day RAMRs, which evaluate hospital performance, ranged from 0% to 28.68%. Among the 17 hospitals rated "Worse" than expected, the average RAMR was 18.09% (range: 13.31 – 28.68%), more than three times the average RAMR for the 15 hospitals rated "Better" than expected (average 5.76%; range: 1.51 - 7.40%).

Risk-adjusted 30-day readmission rates: Among the 67,888 ischemic stroke patients discharged from 325 California hospitals between January 1, 2013 and December 31, 2014, 8,055 patients were readmitted for any reason within 30 days of discharge following an ischemic stroke hospitalization, reflecting an overall statewide 30-day readmission rate of 11.87% (Table 9). The observed 30-day readmission rates at California hospitals ranged from 2.78% to 22.34%. The expected 30-day readmission rate, calculated by the risk model to reflect patients' demographics and severity of illness, varied between 9.55% and 15.96%. The 30-day RARRs ranged from 2.90% to 22.20%. Among the four hospitals rated "Worse" than expected, the average RARR was 19.08% (range: 18.55 – 21.77%), almost three times the average RARR for the five hospitals rated "Better" than expected (average 6.02%; range: 3.45 – 7.64%).

GUIDE TO INTERPRETING TABLES 8 & 9: HOSPITAL RISK-ADJUSTED OUTCOMES RESULTS, 2013-2014	
Ischemic Stroke Cases	The total number of acute ischemic stroke cases submitted to PDD for 2013-2014.
Ischemic Stroke Deaths	The number of deaths includes all deaths occurring within 30 days of the index stroke admission.
Ischemic Stroke Readmissions	The number of hospital readmissions within 30 days of being discharged from the hospital. Patients who were transferred from one hospital to another during the acute stroke episode are not considered to be a readmission.

**GUIDE TO INTERPRETING TABLES 8 & 9: HOSPITAL RISK-ADJUSTED
OUTCOMES RESULTS, 2013-2014**

Observed Mortality Rate	The ratio of the number of ischemic stroke deaths and the ischemic stroke cases multiplied by 100: Observed Mortality Rate = Number of Ischemic Stroke Deaths/ Ischemic Stroke Cases × 100.
Observed Readmission Rate	The ratio of the number of ischemic stroke readmissions and the ischemic stroke cases multiplied by 100: Observed Readmission Rate = Number of Ischemic Stroke Readmissions/ Ischemic Stroke Cases × 100.
Expected Mortality Rate	The ratio of the expected number of ischemic stroke deaths predicted for a provider (after risk-adjusting for their patient population) and the ischemic stroke cases multiplied by 100: Expected Mortality Rate = Number of Expected Deaths/ Ischemic Stroke Cases × 100.
Expected Readmission Rate	The ratio of the expected number of ischemic stroke readmissions predicted for a provider (after risk-adjusting for their patient population) and the ischemic stroke cases multiplied by 100: Expected Readmission Rate = Number of Expected Readmissions/ Ischemic Stroke Cases × 100.
Risk-Adjusted Mortality Rate (RAMR) and 98% Confidence Interval (CI)	The RAMR is obtained by multiplying the California observed mortality rate by a provider's O/E ratio. The 98% confidence interval represents the confidence in the estimate for the RAMR. The lower and upper confidence limits are calculated using Poisson exact confidence interval calculations.
Risk-Adjusted Readmission Rate (RARR) and 98% Confidence Interval (CI)	The RARR is obtained by multiplying the California observed readmission rate by a provider's O/E ratio. The 98% confidence interval represents the confidence in the estimate for the RARR. 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 rate to the California observed rate. A provider is classified as "Better" if the upper 98% confidence limit of its risk-adjusted rate falls below the California observed rate. A provider is classified as "Worse" if the lower 98% confidence limit of its risk-adjusted rate is higher than the California observed rate.

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Alameda	Alameda Hospital	124	16	12.90	12.49	10.28	5.83-16.08	
	Alta Bates Summit Medical Center – Alta Bates Campus	346	15	4.34	9.05	4.77	2.53-7.99	Better
	Alta Bates Summit Medical Center – Summit Campus – Hawthorne	490	49	10.00	8.70	11.44	8.40-15.06	
	Eden Medical Center	459	54	11.77	10.69	10.96	8.18-14.18	
	Highland Hospital	201	13	6.47	4.31	14.94	7.71-25.18	
	Kaiser Foundation Hospital – Hayward	282	42	14.89	13.08	11.34	8.18-15.03	
	Kaiser Foundation Hospital – Oakland Campus	415	42	10.12	11.19	9.01	6.50-11.98	
	Kaiser Foundation Hospital – Oakland/Richmond	176	13	7.39	9.59	7.66	3.94-13.07	
	Kaiser Foundation Hospital – San Leandro	71	8	11.27	13.06	8.59	3.70-15.70	
	Saint Rose Hospital	99	8	8.08	7.58	10.61	4.49-20.27	
San Leandro Hospital	72	10	13.89	10.24	13.50	6.18-23.55		

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Statewide		73,982	7,364	9.95				
Alameda (continued)	Valleycare Medical Center	124	11	8.87	9.13	9.67	4.47-17.24	
	Washington Hospital – Fremont	343	30	8.75	10.72	8.12	5.31-11.67	
Amador	Sutter Amador Hospital	117	15	12.82	10.19	12.52	6.76-20.33	
Butte	Enloe Medical Center – Esplanade	489	63	12.88	11.53	11.12	8.48-14.17	
	Feather River Hospital	137	13	9.49	10.37	9.11	4.55-15.56	
	Oroville Hospital	228	14	6.14	8.09	7.56	3.83-12.93	
Calaveras	Mark Twain Medical Center	44	5	11.36	9.84	11.49	3.25-25.45	
Contra Costa	Contra Costa Regional Medical Center	114	6	5.26	3.78	13.86	4.52-30.66	
	Doctors Medical Center – San Pablo	221	20	9.05	9.97	9.04	5.47-13.70	
	John Muir Medical Center – Concord Campus	326	28	8.59	10.52	8.13	5.29-11.70	
	John Muir Medical Center – Walnut Creek Campus	484	64	13.22	13.98	9.41	7.23-11.91	
	Kaiser Foundation Hospital – Antioch	302	39	12.91	12.85	10.00	7.23-13.30	

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County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Contra Costa (continued)	Kaiser Foundation Hospital – Walnut Creek	356	36	10.11	13.09	7.69	5.35-10.55	
	San Ramon Regional Medical Center	197	23	11.68	12.53	9.27	5.77-13.72	
	Sutter Delta Medical Center	151	9	5.96	8.89	6.67	2.81-12.50	
Del Norte	Sutter Coast Hospital	109	10	9.17	11.32	8.07	3.56-14.73	
El Dorado	Marshall Medical Center	189	22	11.64	12.59	9.20	5.73-13.61	
Fresno	Clovis Community Medical Center	313	37	11.82	9.25	12.72	8.90-17.33	
	Community Regional Medical Center – Fresno	801	76	9.49	6.48	14.57	11.39-18.22	Worse
	Kaiser Foundation Hospital – Fresno	305	41	13.44	10.89	12.28	8.74-16.48	
	Saint Agnes Medical Center	716	87	12.15	10.17	11.90	9.50-14.61	
Humboldt	Mad River Community Hospital	60	7	11.67	9.85	11.79	4.26-23.64	
	Redwood Memorial Hospital	33	6	18.18	9.44	19.17	6.57-38.30	
	Saint Joseph Hospital – Eureka	198	18	9.09	9.98	9.07	5.20-14.28	
Imperial	El Centro Regional Medical Center	226	12	5.31	8.61	6.14	3.02-10.79	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Imperial (continued)	Pioneers Memorial Healthcare District	164	9	5.49	7.43	7.35	3.05-14.13	
Kern	Bakersfield Heart Hospital	90	9	10.00	8.08	12.31	5.29-22.99	
	Bakersfield Memorial Hospital	361	36	9.97	8.09	12.27	8.48-16.90	
	Kern Medical Center	50	0	0.00	2.85	0.00	0.00-29.20	
	Mercy Hospital – Bakersfield	251	22	8.77	9.35	9.33	5.78-13.91	
	Ridgecrest Regional Hospital	34	8	23.53	13.10	17.88	7.95-31.70	
	San Joaquin Community Hospital	606	70	11.55	8.16	14.08	10.92-17.72	Worse
Kings	Adventist Medical Center	248	22	8.87	7.02	12.58	7.61-19.05	
Lake	Sutter Lakeside Hospital	63	7	11.11	11.13	9.93	3.56-20.13	
Los Angeles	Alhambra Hospital	110	7	6.36	9.25	6.85	2.54-14.02	
	Antelope Valley Hospital	438	56	12.79	8.05	15.80	11.96-20.29	Worse
	Beverly Hospital	154	14	9.09	9.16	9.88	5.43-16.17	
	California Hospital Medical Center – Los Angeles	345	24	6.96	5.31	13.03	8.11-19.46	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Los Angeles (continued)	Cedars Sinai Medical Center	782	60	7.67	11.16	6.84	5.17-8.81	Better
	Centinela Hospital Medical Center	428	14	3.27	5.60	5.82	2.90-10.16	
	Citrus Valley Medical Center – Inter-Community Campus	146	10	6.85	8.09	8.43	3.76-15.59	
	Citrus Valley Medical Center – Queen of the Valley Campus	370	25	6.76	8.16	8.25	5.22-12.16	
	College Medical Center	37	2	5.41	13.84	3.89	0.35-12.65	
	Community and Mission Hospital of Huntington Park – Slauson	38	2	5.26	6.12	8.55	0.66-30.40	
	Community Hospital of Long Beach	54	5	9.26	9.77	9.43	2.60-21.46	
	Encino Hospital Medical Center	34	2	5.88	17.61	3.32	0.26-11.77	
	Foothill Presbyterian Hospital – Johnston Memorial	101	10	9.90	7.56	13.04	5.92-23.55	
	Garfield Medical Center	316	25	7.91	11.75	6.70	4.31-9.76	Better
	Glendale Adventist Medical Center – Wilson Terrace	409	34	8.31	13.11	6.31	4.29-8.81	Better

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Los Angeles (continued)	Glendale Memorial Hospital and Medical Center	144	6	4.17	8.32	4.98	1.57-11.08	
	Good Samaritan Hospital – Los Angeles	198	13	6.57	8.84	7.39	3.70-12.64	
	Henry Mayo Newhall Memorial Hospital	296	22	7.43	9.76	7.58	4.60-11.52	
	Hollywood Presbyterian Medical Center	252	21	8.33	9.73	8.53	5.16-12.88	
	Huntington Memorial Hospital	559	49	8.77	10.72	8.14	5.93-10.78	
	Kaiser Foundation Hospital – Baldwin Park	474	42	8.86	7.11	12.40	8.72-16.87	
	Kaiser Foundation Hospital – Downey	431	25	5.80	6.09	9.47	5.94-14.10	
	Kaiser Foundation Hospital – Panorama City	252	34	13.49	7.52	17.85	12.21-24.67	Worse
	Kaiser Foundation Hospital – South Bay	316	31	9.81	9.23	10.58	7.08-14.92	
	Kaiser Foundation Hospital – Sunset	413	38	9.20	8.45	10.84	7.60-14.79	
	Kaiser Foundation Hospital – West Los Angeles	454	25	5.51	6.03	9.10	5.59-13.74	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Los Angeles (continued)	Kaiser Foundation Hospital – Woodland Hills	322	38	11.80	11.43	10.28	7.21-13.98	
	Keck Hospital of University of Southern California	40	1	2.50	10.03	2.48	0.02-13.92	
	Lakewood Regional Medical Center	368	30	8.15	6.76	12.01	7.87-17.26	
	Long Beach Memorial Medical Center	688	52	7.56	7.75	9.71	7.15-12.77	
	Los Angeles Community Hospital	31	1	3.23	5.21	6.17	0.06-35.42	
	Los Angeles County/Harbor – UCLA Medical Center	284	17	5.99	4.64	12.85	7.28-20.32	
	Los Angeles County/Olive View – UCLA Medical Center	149	1	0.67	3.06	2.18	0.02-13.04	
	Los Angeles County/University of Southern California Medical Center	232	23	9.91	5.20	18.97	12.06-27.88	Worse
	Marina Del Rey Hospital	69	7	10.15	9.13	11.06	4.00-22.25	
	Memorial Hospital of Gardena	97	5	5.16	5.55	9.24	2.62-21.44	
Methodist Hospital of Southern California	545	52	9.54	11.57	8.21	6.08-10.72		

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Los Angeles (continued)	Mission Community Hospital – Panorama Campus	48	3	6.25	11.64	5.34	0.94-14.62	
	Monterey Park Hospital	55	2	3.64	8.30	4.36	0.34-15.68	
	Northridge Hospital Medical Center	342	43	12.57	10.67	11.73	8.44-15.62	
	Olympia Medical Center	62	3	4.84	12.62	3.82	0.58-10.93	
	Pacific Alliance Medical Center, Inc.	116	4	3.45	6.72	5.11	1.13-13.47	
	Pacifica Hospital of the Valley	34	1	2.94	4.65	6.30	0.06-36.95	
	Palmdale Regional Medical Center	181	12	6.63	5.95	11.09	5.23-19.83	
	PIH Hospital – Downey	206	20	9.71	8.03	12.04	7.10-18.51	
	Pomona Valley Hospital Medical Center	576	54	9.38	9.88	9.45	7.02-12.32	
	Presbyterian Intercommunity Hospital	628	65	10.35	11.52	8.94	6.83-11.39	
	Providence Holy Cross Medical Center	375	43	11.47	10.03	11.38	8.14-15.22	
Providence Little Company of Mary Medical Center – San Pedro	155	16	10.32	10.76	9.55	5.31-15.28		

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Los Angeles (continued)	Providence Little Company of Mary Medical Center – Torrance	587	48	8.18	7.93	10.26	7.40-13.71	
	Providence Saint Joseph Medical Center	553	67	12.12	12.26	9.84	7.62-12.37	
	Providence Tarzana Medical Center	232	19	8.19	11.98	6.80	3.92-10.68	
	Ronald Reagan UCLA Medical Center	461	49	10.63	15.53	6.81	5.07-8.84	Better
	Saint Francis Medical Center	262	16	6.11	7.57	8.03	4.67-12.81	
	Saint John’s Health Center	162	8	4.94	11.03	4.46	1.75-8.93	Better
	Saint Mary Medical Center	197	17	8.63	9.25	9.29	5.22-14.74	
	Saint Vincent Medical Center	158	6	3.80	7.84	4.82	1.63-10.64	
	San Dimas Community Hospital	55	3	5.46	7.15	7.59	1.14-22.68	
	San Gabriel Valley Medical Center	129	12	9.30	12.56	7.37	3.75-12.40	
	Santa Monica – UCLA Medical Center and Orthopedic Hospital	200	9	4.50	9.56	4.69	2.02-8.90	Better
Sherman Oaks Hospital	57	1	1.75	11.57	1.51	0.02-8.71	Better	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Los Angeles (continued)	Southern California Hospital at Culver City	101	2	1.98	7.85	2.51	0.19-9.66	Better
	Temple Community Hospital	45	1	2.22	9.56	2.31	0.02-13.47	
	Torrance Memorial Medical Center	614	67	10.91	10.66	10.19	7.85-12.88	
	University of Southern California Verdugo Hills Hospital	126	18	14.29	9.63	14.76	8.42-22.99	
	Valley Presbyterian Hospital	238	23	9.66	10.07	9.56	5.95-14.17	
	West Hills Hospital and Medical Center	241	32	13.28	11.25	11.75	7.93-16.39	
	White Memorial Medical Center	350	21	6.00	9.34	6.39	3.82-9.78	Better
	Whittier Hospital Medical Center	91	5	5.50	7.22	7.58	2.11-17.52	
Madera	Madera Community Hospital	66	11	16.67	5.78	28.68	13.69-49.28	Worse
Marin	Kaiser Foundation Hospital – San Rafael	199	18	9.05	12.58	7.16	4.14-11.20	
	Marin General Hospital	268	28	10.45	13.03	7.98	5.23-11.46	
	Novato Community Hospital	60	4	6.67	8.30	8.00	1.76-20.67	
Mendocino	Frank R. Howard Memorial Hospital	43	4	9.30	10.45	8.86	1.99-21.90	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Mendocino (continued)	Mendocino Coast District Hospital	30	6	20.00	11.73	16.97	5.95-33.07	
	Ukiah Valley Medical Center	118	25	21.19	13.23	15.94	10.51-22.44	Worse
Merced	Mercy Medical Center – Merced	292	26	8.90	11.17	7.94	5.12-11.52	
Monterey	Community Hospital Monterey Peninsula	396	35	8.84	9.20	9.56	6.46-13.41	
	Natividad Medical Center	55	0	0.00	2.26	0.00	0.00-34.64	
	Salinas Valley Memorial Hospital	333	31	9.31	10.07	9.20	6.14-12.99	
Napa	Queen of the Valley Hospital – Napa	209	35	16.75	12.65	13.18	9.17-17.95	
	Saint Helena Hospital	46	5	10.87	13.80	7.84	2.22-17.36	
Nevada	Sierra Nevada Memorial Hospital	174	23	13.22	11.55	11.39	7.14-16.80	
Orange	AHMC Anaheim Regional Medical Center	221	15	6.79	7.10	9.52	5.10-15.74	
	Fountain Valley Regional Hospital and Medical Center – Euclid	480	47	9.79	11.60	8.40	6.20-10.99	
	Garden Grove Hospital and Medical Center	68	5	7.35	8.51	8.60	2.37-19.70	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Orange (continued)	Hoag Memorial Hospital Presbyterian	869	91	10.47	11.18	9.33	7.46-11.44	
	Huntington Beach Hospital	64	2	3.13	8.94	3.48	0.27-12.83	
	Kaiser Foundation Hospital – Anaheim	575	51	8.87	8.91	9.91	7.30-13.03	
	La Palma Intercommunity Hospital	66	4	6.06	7.52	8.02	1.71-21.15	
	Los Alamitos Medical Center	412	51	12.38	11.37	10.84	8.02-14.14	
	Mission Hospital Regional Medical Center	482	44	9.13	12.40	7.32	5.25-9.83	Better
	Orange Coast Memorial Medical Center	193	19	9.85	8.95	10.95	6.40-17.02	
	Placentia Linda Hospital	74	13	17.57	9.30	18.81	10.02-30.72	Worse
	Saddleback Memorial Medical Center	503	84	16.70	14.51	11.46	9.22-13.96	
	Saint Joseph Hospital – Orange	468	55	11.75	10.98	10.65	7.98-13.77	
	Saint Jude Medical Center	592	75	12.67	14.18	8.90	7.02-11.01	
	UC Irvine Medical Center	417	45	10.79	11.56	9.29	6.79-12.22	
West Anaheim Medical Center	114	10	8.77	10.07	8.67	3.82-15.82		

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Orange (continued)	Western Medical Center – Santa Ana	228	33	14.47	11.27	12.78	8.88-17.49	
Placer	Kaiser Foundation Hospital – Roseville	531	57	10.73	12.87	8.31	6.23-10.72	
	Sutter Auburn Faith Hospital	163	17	10.43	9.10	11.40	6.28-18.41	
	Sutter Roseville Medical Center	528	65	12.31	10.76	11.38	8.72-14.45	
Riverside	Corona Regional Medical Center – Main	126	4	3.18	6.86	4.61	0.98-12.42	
	Desert Regional Medical Center	616	90	14.61	10.23	14.21	11.44-17.31	Worse
	Eisenhower Medical Center	843	75	8.90	10.06	8.80	6.81-11.10	
	Hemet Valley Medical Center	304	48	15.79	12.61	12.46	9.27-16.18	
	John F. Kennedy Memorial Hospital	83	7	8.43	8.17	10.27	3.84-20.73	
	Kaiser Foundation Hospital – Moreno Valley	134	17	12.69	8.51	14.84	8.40-23.28	
	Kaiser Foundation Hospital – Riverside	245	25	10.20	7.44	13.66	8.64-20.06	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Riverside (continued)	Loma Linda University Medical Center – Murrieta	144	6	4.17	7.41	5.60	1.74-12.66	
	Menifee Valley Medical Center	83	15	18.07	11.41	15.77	8.80-24.88	
	Parkview Community Hospital Medical Center	173	14	8.09	7.65	10.53	5.49-17.61	
	Riverside Community Hospital	550	46	8.36	8.28	10.05	7.25-13.43	
	Riverside County Regional Medical Center	325	21	6.46	6.90	9.33	5.59-14.25	
	San Geronio Memorial Hospital	63	6	9.52	9.30	10.19	3.25-21.99	
	Southwest Healthcare System – Murrieta	380	37	9.74	8.62	11.25	7.79-15.50	
	Temecula Valley Hospital	78	5	6.41	9.35	6.83	1.84-15.98	
Sacramento	Kaiser Foundation Hospital – Sacramento	439	68	15.49	12.62	12.22	9.57-15.19	
	Kaiser Foundation Hospital – South Sacramento	502	42	8.37	9.93	8.38	6.00-11.26	
	Mercy General Hospital	370	27	7.30	9.94	7.31	4.70-10.60	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Sacramento (continued)	Mercy Hospital – Folsom	149	11	7.38	8.02	9.16	4.32-16.35	
	Mercy San Juan Hospital	771	99	12.84	11.60	11.02	8.94-13.33	
	Methodist Hospital of Sacramento	404	44	10.89	8.65	12.53	9.06-16.66	
	Sutter General Hospital	445	38	8.54	7.92	10.73	7.45-14.75	
	Sutter Memorial Hospital	158	16	10.13	9.61	10.49	5.77-16.90	
	UC Davis Medical Center	509	41	8.06	7.89	10.17	7.25-13.71	
San Benito	Hazel Hawkins Memorial Hospital	40	5	12.50	9.36	13.30	3.70-29.72	
San Bernardino	Arrowhead Regional Medical Center	447	25	5.59	5.56	10.01	6.24-14.90	
	Barstow Community Hospital	97	12	12.37	7.23	17.04	8.33-29.31	
	Chino Valley Medical Center	70	4	5.71	8.51	6.68	1.44-17.24	
	Community Hospital of San Bernardino	38	2	5.26	7.78	6.74	0.63-21.64	
	Desert Valley Hospital	230	9	3.91	8.18	4.76	1.93-9.36	Better
	Hi-Desert Medical Center	48	4	8.33	8.92	9.30	2.02-23.53	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
San Bernardino (continued)	Kaiser Foundation Hospital – Fontana	554	56	10.11	8.80	11.43	8.56-14.79	
	Loma Linda University Medical Center	580	70	12.07	8.87	13.54	10.53-16.98	Worse
	Redlands Community Hospital	316	40	12.66	11.43	11.02	7.84-14.80	
	Saint Bernadine Medical Center	269	26	9.67	8.32	11.57	7.55-16.64	
	Saint Mary Regional Medical Center	361	24	6.65	7.53	8.78	5.42-13.17	
	San Antonio Community Hospital	511	57	11.16	9.50	11.68	8.78-15.06	
	Victor Valley Global Medical Center	92	7	7.61	6.08	12.45	4.53-25.37	
San Diego	Alvarado Hospital	149	19	12.75	11.60	10.94	6.50-16.53	
	Grossmont Hospital	969	100	10.32	11.10	9.26	7.50-11.23	
	Kaiser Foundation Hospital – San Diego	548	57	10.40	9.51	10.89	8.15-14.07	
	Palomar Health Downtown Campus	818	79	9.66	10.60	9.07	7.10-11.32	
	Paradise Valley Hospital	98	5	5.10	6.78	7.49	1.98-18.11	
	Pomerado Hospital	190	25	13.16	11.80	11.10	7.09-16.09	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
San Diego (continued)	Scripps Green Hospital	188	17	9.04	12.59	7.15	4.04-11.35	
	Scripps Memorial Hospital – Encinitas	356	40	11.24	15.10	7.40	5.27-9.97	
	Scripps Memorial Hospital – La Jolla	417	57	13.67	14.62	9.31	7.01-11.95	
	Scripps Mercy Hospital	781	65	8.32	9.23	8.97	6.85-11.45	
	Sharp Chula Vista Medical Center	481	38	7.90	9.00	8.74	6.03-12.06	
	Sharp Coronado Hospital and Healthcare Center	41	6	14.63	11.76	12.38	4.14-24.84	
	Sharp Memorial Hospital	645	69	10.70	9.74	10.93	8.45-13.79	
	Tri-City Medical Center – Oceanside	534	50	9.36	11.39	8.18	6.04-10.74	
	UC San Diego Medical Center	370	29	7.84	9.69	8.05	5.28-11.53	
San Francisco	California Pacific Medical Center – Davies Campus	271	22	8.12	13.39	6.03	3.69-9.06	Better
	California Pacific Medical Center – Pacific Campus	352	31	8.81	11.58	7.57	5.02-10.74	
	California Pacific Medical Center – St. Luke’s Campus	50	4	8.00	6.09	13.07	2.97-32.27	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
San Francisco (continued)	Chinese Hospital	81	4	4.94	7.09	6.93	1.47-18.58	
	Kaiser Foundation Hospital – San Francisco	320	28	8.75	9.19	9.48	6.19 -13.65	
	Saint Francis Memorial Hospital	176	19	10.80	11.15	9.63	5.64 -14.83	
	Saint Mary’s Medical Center – San Francisco	145	17	11.72	11.64	10.03	5.60-15.92	
	San Francisco General Hospital	307	38	12.38	6.26	19.67	13.96 -26.54	Worse
	UC San Francisco Medical Center	357	42	11.77	10.92	10.72	7.64-14.37	
San Joaquin	Dameron Hospital	179	15	8.38	8.64	9.66	5.11-15.94	
	Doctors Hospital of Manteca	100	7	7.00	9.02	7.73	2.74-16.06	
	Kaiser Foundation Hospital – Manteca	147	19	12.93	12.23	10.52	6.37-15.78	
	Lodi Memorial Hospital	123	20	16.26	12.34	13.12	7.95-19.65	
	Saint Joseph’s Medical Center of Stockton	419	46	10.98	9.03	12.10	8.77-16.06	
	San Joaquin General Hospital	174	22	12.64	5.28	23.84	14.86-35.23	Worse

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
San Joaquin (continued)	Sutter Tracy Community Hospital	90	6	6.67	8.30	8.00	2.56-17.24	
San Luis Obispo	French Hospital Medical Center	103	13	12.62	11.07	11.35	5.80-19.00	
	Marian Regional Medical Center – Arroyo Grande	116	14	12.07	9.27	12.95	6.95-21.27	
	Sierra Vista Regional Medical Center	136	20	14.71	9.61	15.23	9.02-23.19	
	Twin Cities Community Hospital	185	23	12.43	8.43	14.69	8.91-22.11	
San Mateo	Kaiser Foundation Hospital – Redwood City	346	38	10.98	11.86	9.22	6.42-12.61	
	Kaiser Foundation Hospital – South San Francisco	211	23	10.90	10.28	10.55	6.55-15.62	
	Mills-Peninsula Medical Center	397	42	10.58	14.23	7.40	5.29-9.92	Better
	San Mateo Medical Center	47	0	0.00	3.18	0.00	0.00-26.74	
	Sequoia Hospital	137	14	10.22	10.67	9.53	4.86-16.05	
	Seton Medical Center	264	26	9.85	10.52	9.32	5.93-13.60	
	Lompoc Valley Medical Center	65	7	10.77	9.41	11.39	4.05-23.08	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Santa Barbara	Marian Regional Medical Center	280	39	13.93	9.07	15.28	10.73-20.72	Worse
	Santa Barbara Cottage Hospital	579	77	13.30	12.17	10.88	8.60-13.46	
Santa Clara	El Camino Hospital	413	48	11.62	12.07	9.58	7.02-12.60	
	Good Samaritan Hospital – San Jose	528	56	10.61	9.60	11.00	8.20-14.29	
	Kaiser Foundation Hospital – San Jose	350	42	12.00	12.25	9.75	7.03-12.95	
	Kaiser Foundation Hospital – Santa Clara	465	53	11.40	12.92	8.78	6.59-11.31	
	O’Connor Hospital	241	30	12.45	11.60	10.68	7.22-14.95	
	Regional Medical of San Jose	503	49	9.74	8.97	10.82	7.86-14.31	
	Saint Louise Regional Hospital	100	10	10.00	7.43	13.40	5.88-24.58	
	Santa Clara Valley Medical Center	407	18	4.42	4.07	10.82	5.98-17.60	
	Stanford Hospital	375	38	10.13	12.14	8.31	5.83-11.32	
Santa Cruz	Dominican Hospital – Santa Cruz/Soquel	307	32	10.42	10.92	9.50	6.37-13.39	
	Watsonville Community Hospital	96	12	12.50	9.77	12.73	6.48-21.56	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Shasta	Mercy Medical Center – Redding	367	54	14.71	11.10	13.19	9.89-17.01	
	Shasta Regional Medical Center	256	17	6.64	7.50	8.81	4.77-14.47	
Siskiyou	Fairchild Medical Center	60	6	10.00	10.68	9.32	3.16-19.42	
	Mercy Medical Center Mt. Shasta	30	7	23.33	8.18	28.40	10.87-52.07	Worse
Solano	Kaiser Foundation Hospital – Rehabilitation Center Vallejo	361	22	6.09	11.38	5.33	3.32-7.97	Better
	Kaiser Foundation Hospital – Vacaville	202	15	7.43	11.50	6.43	3.53-10.33	
	North Bay Medical Center	284	32	11.27	11.12	10.09	7.00-13.85	
	Sutter Solano Medical Center	148	7	4.73	7.15	6.59	2.30-13.87	
Sonoma	Healdsburg District Hospital	36	2	5.56	10.59	5.22	0.40-18.92	
	Kaiser Foundation Hospital – Santa Rosa	286	51	17.83	13.95	12.73	9.66-16.26	
	Palm Drive Hospital	36	4	11.11	17.30	6.39	1.47-15.00	
	Petaluma Valley Hospital	75	5	6.67	9.02	7.36	2.02-17.24	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Sonoma (continued)	Santa Rosa Memorial Hospital – Montgomery	344	49	14.24	12.63	11.23	8.28-14.66	
	Sonoma Valley Hospital	60	8	13.33	14.67	9.05	3.60-17.13	
	Sutter Medical Center of Santa Rosa	107	9	8.41	8.44	9.92	4.30-18.61	
Stanislaus	Doctors Medical Center	538	56	10.41	7.48	13.85	10.32-17.99	Worse
	Emanuel Medical Center, Inc.	138	13	9.42	10.03	9.35	4.91-15.58	
	Memorial Hospital Medical Center – Modesto	518	48	9.27	9.98	9.25	6.69-12.31	
	Oak Valley District Hospital	33	1	3.03	9.66	3.12	0.03-18.04	
Tehama	Saint Elizabeth Community Hospital	93	12	12.90	12.14	10.58	5.41-17.71	
Tulare	Kaweah Delta Medical Center	567	66	11.64	8.71	13.31	10.24-16.87	Worse
	Sierra View District Hospital	184	20	10.87	8.62	12.56	7.47-19.30	
	Tulare Regional Medical Center	47	10	21.28	14.46	14.65	7.05-24.65	
Tuolumne	Sonora Regional Medical Center – Greenley	144	22	15.28	10.84	14.03	8.76-20.72	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		73,982	7,364	9.95				
Ventura	Community Memorial Hospital – San Buenaventura	354	32	9.04	11.99	7.51	4.99-10.64	
	Los Robles Hospital and Medical Center	297	34	11.45	10.10	11.28	7.65-15.72	
	Saint John’s Pleasant Valley Hospital	133	19	14.29	11.02	12.90	7.60-19.76	
	Saint John’s Regional Medical Center	267	28	10.49	10.14	10.29	6.73-14.74	
	Simi Valley Hospital and Healthcare Services – Sycamore	157	16	10.19	9.93	10.21	5.74-16.27	
	Ventura County Medical Center	151	13	8.61	7.80	10.99	5.64-18.47	
Yolo	Sutter Davis Hospital	67	4	5.97	11.88	5.00	1.09-12.98	
	Woodland Memorial Hospital	91	19	20.88	10.03	20.72	12.51-30.87	Worse
Yuba	Rideout Memorial Hospital	344	36	10.47	8.70	11.97	8.24-16.52	

* A Hospital is classified as “Better” if the upper 98% Confidence Interval (CI) of the risk-adjusted rate falls below the California observed rate 9.95% for RAMR. A hospital is classified as “Worse” if the lower 98% CI of the risk-adjusted rate is higher than the California observed rate. A hospital’s performance is classified as “As Expected” (rating is blank) if the California observed rate falls within the 98% CI of the hospital risk-adjusted rate.

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Alameda	Alameda Hospital	109	18	16.51	11.83	16.56	9.23-26.33	
	Alta Bates Summit Medical Center – Alta Bates Campus	325	29	8.92	11.73	9.02	5.70-13.36	
	Alta Bates Summit Medical Center – Summit Campus – Hawthorne	449	57	12.70	13.22	11.39	8.36-15.01	
	Eden Medical Center	422	53	12.56	12.15	12.27	8.88-16.33	
	Highland Hospital	182	26	14.29	11.04	15.36	9.51-22.89	
	Kaiser Foundation Hospital – Hayward	264	31	11.74	13.65	10.21	6.59-14.82	
	Kaiser Foundation Hospital – Oakland Campus	393	55	14.00	14.05	11.82	8.64-15.59	
	Kaiser Foundation Hospital – Oakland/Richmond	142	25	17.61	13.89	15.04	9.30-22.30	
	Kaiser Foundation Hospital – San Leandro	57	8	14.04	13.48	12.35	4.68-24.52	
	Saint Rose Hospital	94	21	22.34	12.17	21.77	12.97-32.80	Worse
San Leandro Hospital	63	5	7.94	13.20	7.13	1.88-17.27		

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Alameda (continued)	Valleycare Medical Center	120	6	5.00	10.97	5.41	1.64-12.59	
	Washington Hospital – Fremont	316	33	10.44	12.01	10.31	6.74-14.87	
Amador	Sutter Amador Hospital	102	13	12.75	10.45	14.47	7.03-25.29	
Butte	Enloe Medical Center – Esplanade	454	47	10.35	10.47	11.73	8.27-15.98	
	Feather River Hospital	131	13	9.92	11.01	10.70	5.15-18.94	
	Oroville Hospital	212	40	18.87	12.07	18.55	12.86-25.35	Worse
Calaveras	Mark Twain Medical Center	41	6	14.63	9.81	17.70	5.51-38.43	
Contra Costa	Contra Costa Regional Medical Center	102	16	15.69	10.84	17.16	9.14-28.14	
	Doctors Medical Center – San Pablo	209	28	13.40	13.09	12.14	7.69-17.83	
	John Muir Medical Center – Concord Campus	300	35	11.67	12.66	10.94	7.27-15.55	
	John Muir Medical Center – Walnut Creek Campus	439	48	10.93	12.08	10.74	7.62-14.55	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Contra Costa (continued)	Kaiser Foundation Hospital – Antioch	278	43	15.47	13.82	13.28	9.30-18.09	
	Kaiser Foundation Hospital – Walnut Creek	335	40	11.94	12.94	10.95	7.50-15.21	
	San Ramon Regional Medical Center	177	14	7.91	11.29	8.31	4.11-14.56	
	Sutter Delta Medical Center	143	15	10.49	13.44	9.26	4.76-15.69	
Del Norte	Sutter Coast Hospital	100	8	8.00	10.31	9.21	3.43-19.00	
El Dorado	Marshall Medical Center	178	13	7.30	11.25	7.70	3.69-13.80	
Fresno	Clovis Community Medical Center	291	29	9.97	11.49	10.29	6.51-15.20	
	Community Regional Medical Center – Fresno	727	93	12.79	11.87	12.79	10.08-15.90	
	Kaiser Foundation Hospital – Fresno	281	27	9.61	12.74	8.95	5.55-13.41	
	Saint Agnes Medical Center	657	88	13.39	12.26	12.96	10.15-16.19	
Humboldt	Mad River Community Hospital	54	3	5.56	9.59	6.87	1.02-21.46	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Humboldt (continued)	Saint Joseph Hospital – Eureka	179	9	5.03	12.11	4.93	1.95-9.95	Better
Imperial	El Centro Regional Medical Center	213	27	12.68	12.78	11.77	7.35-17.48	
	Pioneers Memorial Healthcare District	155	22	14.19	12.29	13.71	8.10-21.08	
Kern	Bakersfield Heart Hospital	85	11	12.94	11.07	13.87	6.25-25.27	
	Bakersfield Memorial Hospital	330	41	12.42	11.54	12.77	8.81-17.65	
	Kern Medical Center	50	5	10.00	12.36	9.60	2.54-22.95	
	Mercy Hospital – Bakersfield	231	33	14.29	10.97	15.45	10.19-22.03	
	San Joaquin Community Hospital	560	67	11.96	11.52	12.32	9.26-15.93	
Kings	Adventist Medical Center	229	21	9.17	11.34	9.59	5.52-15.15	
Lake	Sutter Lakeside Hospital	58	4	6.90	11.33	7.22	1.52-19.48	
Los Angeles	Alhambra Hospital	104	13	12.50	13.25	11.20	5.47-19.45	
	Antelope Valley Hospital	400	60	15.00	11.67	15.25	11.31-19.87	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Los Angeles (continued)	Beverly Hospital	143	20	13.99	13.13	12.64	7.26-19.80	
	California Hospital Medical Center – Los Angeles	318	44	13.84	12.14	13.53	9.48-18.44	
	Cedars Sinai Medical Center	718	110	15.32	12.49	14.55	11.74-17.71	
	Centinela Hospital Medical Center	410	76	18.54	14.90	14.76	11.42-18.57	
	Citrus Valley Medical Center – Inter-Community Campus	137	20	14.60	11.99	14.44	8.31-22.59	
	Citrus Valley Medical Center – Queen of the Valley Campus	353	46	13.03	11.15	13.87	9.79-18.82	
	College Medical Center	35	3	8.57	15.96	6.37	0.97-18.75	
	Community and Mission Hospital of Huntington Park – Slauson	35	4	11.43	11.96	11.34	2.44-29.08	
	Community Hospital of Long Beach	48	3	6.25	12.44	5.96	0.89-18.23	
	Foothill Presbyterian Hospital – Johnston Memorial	91	12	13.19	10.09	15.50	7.27-27.59	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Los Angeles (continued)	Garfield Medical Center	293	48	16.38	12.90	15.06	10.79-20.15	
	Glendale Adventist Medical Center – Wilson Terrace	382	50	13.09	12.76	12.17	8.72-16.32	
	Glendale Memorial Hospital and Medical Center	136	20	14.71	12.62	13.82	7.95-21.61	
	Good Samaritan Hospital – Los Angeles	187	28	14.97	12.45	14.27	9.05-20.88	
	Henry Mayo Newhall Memorial Hospital	275	38	13.82	11.62	14.11	9.58-19.68	
	Hollywood Presbyterian Medical Center	229	38	16.59	11.70	16.83	11.52-23.30	
	Huntington Memorial Hospital	522	59	11.30	11.99	11.19	8.23-14.72	
	Kaiser Foundation Hospital – Baldwin Park	450	60	13.33	12.56	12.60	9.33-16.46	
	Kaiser Foundation Hospital – Downey	399	41	10.28	12.43	9.81	6.74-13.61	
	Kaiser Foundation Hospital – Panorama City	236	26	11.02	12.20	10.71	6.60-16.09	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Los Angeles (continued)	Kaiser Foundation Hospital – South Bay	283	47	16.61	13.92	14.16	10.12-18.96	
	Kaiser Foundation Hospital – Sunset	375	46	12.27	12.78	11.39	8.03-15.47	
	Kaiser Foundation Hospital – West Los Angeles	429	60	13.99	13.02	12.75	9.45-16.64	
	Kaiser Foundation Hospital – Woodland Hills	293	28	9.56	12.87	8.81	5.52-13.10	
	Keck Hospital of University of Southern California	38	4	10.53	11.79	10.59	2.26-27.49	
	Lakewood Regional Medical Center	343	55	16.04	12.34	15.41	11.29-20.28	
	Long Beach Memorial Medical Center	643	79	12.29	11.95	12.20	9.41-15.45	
	Los Angeles Community Hospital	31	4	12.90	12.95	11.82	2.54-29.96	
	Los Angeles County/Harbor – UCLA Medical Center	265	33	12.45	11.13	13.27	8.72-19.02	
	Los Angeles County/Olive View – UCLA Medical Center	147	12	8.16	10.09	9.60	4.44-17.52	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Los Angeles (continued)	Los Angeles County/University of Southern California Medical Center	199	19	9.55	10.99	10.30	5.75-16.62	
	Marina Del Rey Hospital	65	6	9.23	12.21	8.97	2.77-20.07	
	Memorial Hospital of Gardena	89	14	15.73	13.55	13.77	7.00-23.19	
	Methodist Hospital of Southern California	511	67	13.11	12.46	12.48	9.40-16.10	
	Mission Community Hospital – Panorama Campus	47	7	14.89	14.12	12.51	4.38-25.63	
	Monterey Park Hospital	49	6	12.25	12.16	11.95	3.70-26.31	
	Northridge Hospital Medical Center	314	38	12.10	11.97	12.00	8.13-16.81	
	Olympia Medical Center	57	11	19.30	14.41	15.89	7.32-27.91	
	Pacific Alliance Medical Center, Inc.	112	7	6.25	12.72	5.83	1.98-12.70	
	Pacifica Hospital of the Valley	32	6	18.75	10.02	22.20	7.00-46.77	
	Palmdale Regional Medical Center	170	24	14.12	11.98	13.98	8.49-21.11	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Los Angeles (continued)	PIH Hospital – Downey	193	18	9.33	11.84	9.35	5.11-15.28	
	Pomona Valley Hospital Medical Center	533	54	10.13	11.53	10.42	7.54-13.90	
	Presbyterian Intercommunity Hospital	583	73	12.52	12.22	12.16	9.26-15.53	
	Providence Holy Cross Medical Center	355	52	14.65	12.96	13.41	9.72-17.79	
	Providence Little Company of Mary Medical Center – San Pedro	145	22	15.17	11.74	15.34	9.09-23.49	
	Providence Little Company of Mary Medical Center – Torrance	537	74	13.78	12.28	13.31	10.19-16.94	
	Providence Saint Joseph Medical Center	498	56	11.25	11.63	11.48	8.37-15.20	
	Providence Tarzana Medical Center	215	28	13.02	12.34	12.53	7.91-18.44	
	Ronald Reagan UCLA Medical Center	413	65	15.74	12.68	14.73	11.09-18.97	
	Saint Francis Medical Center	240	31	12.92	13.17	11.63	7.56-16.78	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Los Angeles (continued)	Saint John's Health Center	156	16	10.26	11.81	10.30	5.42-17.22	
	Saint Mary Medical Center	178	31	17.42	14.51	14.24	9.33-20.30	
	Saint Vincent Medical Center	148	19	12.84	11.75	12.97	7.30-20.64	
	San Dimas Community Hospital	55	7	12.73	11.02	13.71	4.78-28.50	
	San Gabriel Valley Medical Center	120	14	11.67	12.94	10.70	5.36-18.37	
	Santa Monica – UCLA Medical Center and Orthopedic Hospital	183	25	13.66	11.63	13.93	8.54-20.92	
	Sherman Oaks Hospital	55	8	14.55	12.55	13.75	5.24-27.14	
	Southern California Hospital at Culver City	96	18	18.75	13.42	16.57	9.29-26.11	
	Temple Community Hospital	44	4	9.09	12.68	8.51	1.81-22.40	
Torrance Memorial Medical Center	552	79	14.31	11.65	14.58	11.27-18.40		

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Los Angeles (continued)	University of Southern California Verdugo Hills Hospital	119	17	14.29	10.32	16.42	8.90-26.73	
	Valley Presbyterian Hospital	207	30	14.49	12.94	13.29	8.58-19.23	
	West Hills Hospital and Medical Center	211	25	11.85	10.72	13.12	8.00-19.84	
	White Memorial Medical Center	330	58	17.58	13.61	15.33	11.37-19.93	
	Whittier Hospital Medical Center	87	12	13.79	12.68	12.90	6.10-22.77	
Madera	Madera Community Hospital	57	6	10.53	11.50	10.87	3.34-24.29	
Marin	Kaiser Foundation Hospital – San Rafael	189	15	7.94	11.69	8.06	4.11-13.82	
	Marin General Hospital	240	23	9.58	10.85	10.48	6.21-16.24	
	Novato Community Hospital	54	7	12.96	10.96	14.04	4.87-29.23	
Mendocino	Frank R. Howard Memorial Hospital	40	2	5.00	10.85	5.47	0.41-21.03	
	Ukiah Valley Medical Center	100	12	12.00	11.72	12.15	5.70-21.67	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Merced	Mercy Medical Center – Merced	267	30	11.24	12.67	10.52	6.74-15.37	
Monterey	Community Hospital Monterey Peninsula	357	35	9.80	10.71	10.86	7.19-15.54	
	Natividad Medical Center	54	4	7.41	9.78	8.99	1.89-24.21	
	Salinas Valley Memorial Hospital	306	31	10.13	11.75	10.23	6.59-14.91	
Napa	Queen of the Valley Hospital – Napa	181	16	8.84	12.37	8.48	4.44-14.27	
	Saint Helena Hospital	45	7	15.56	11.53	16.01	5.63-32.70	
Nevada	Sierra Nevada Memorial Hospital	156	11	7.05	10.17	8.23	3.64-15.49	
Orange	AHMC Anaheim Regional Medical Center	208	24	11.54	11.43	11.97	7.23-18.23	
	Fountain Valley Regional Hospital and Medical Center – Euclid	429	49	11.42	12.97	10.45	7.46-14.07	
	Garden Grove Hospital and Medical Center	66	5	7.58	13.04	6.89	1.82-16.75	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Orange (continued)	Hoag Memorial Hospital Presbyterian	799	92	11.51	10.90	12.53	9.84-15.63	
	Huntington Beach Hospital	60	8	13.33	12.28	12.88	4.87-25.68	
	Kaiser Foundation Hospital – Anaheim	537	64	11.92	11.92	11.86	8.86-15.41	
	La Palma Intercommunity Hospital	64	6	9.38	12.67	8.78	2.70-19.69	
	Los Alamitos Medical Center	384	45	11.72	11.27	12.34	8.65-16.86	
	Mission Hospital Regional Medical Center	445	47	10.56	11.38	11.01	7.77-14.98	
	Orange Coast Memorial Medical Center	180	26	14.44	11.42	15.00	9.30-22.33	
	Placentia Linda Hospital	70	9	12.86	10.38	14.69	5.95-28.34	
	Saddleback Memorial Medical Center	452	46	10.18	11.06	10.92	7.66-14.93	
	Saint Joseph Hospital – Orange	425	60	14.12	11.13	15.06	11.16-19.65	
	Saint Jude Medical Center	535	51	9.53	12.16	9.30	6.65-12.54	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Orange (continued)	UC Irvine Medical Center	376	50	13.30	12.35	12.77	9.16-17.12	
	West Anaheim Medical Center	104	12	11.54	12.31	11.12	5.20-19.90	
	Western Medical Center – Santa Ana	201	24	11.94	11.05	12.82	7.74-19.53	
Placer	Kaiser Foundation Hospital – Roseville	500	48	9.60	12.57	9.06	6.41-12.31	
	Sutter Auburn Faith Hospital	160	8	5.00	10.32	5.75	2.12-12.10	
	Sutter Roseville Medical Center	478	43	9.00	11.70	9.12	6.30-12.63	
Riverside	Corona Regional Medical Center – Main	122	18	14.75	11.23	15.59	8.65-24.95	
	Desert Regional Medical Center	551	68	12.34	10.90	13.43	10.12-17.33	
	Eisenhower Medical Center	786	86	10.94	10.67	12.16	9.46-15.30	
	Hemet Valley Medical Center	278	30	10.79	12.34	10.38	6.66-15.15	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Riverside (continued)	John F. Kennedy Memorial Hospital	77	10	12.99	11.55	13.34	5.73-24.93	
	Kaiser Foundation Hospital – Moreno Valley	125	19	15.20	12.95	13.93	7.89-21.97	
	Kaiser Foundation Hospital – Riverside	226	25	11.06	11.98	10.96	6.68-16.59	
	Loma Linda University Medical Center – Murrieta	136	24	17.65	10.30	20.32	12.41-30.40	Worse
	Menifee Valley Medical Center	75	12	16.00	12.00	15.81	7.51-27.66	
	Parkview Community Hospital Medical Center	163	25	15.34	11.86	15.35	9.44-22.93	
	Riverside Community Hospital	515	58	11.26	11.50	11.62	8.52-15.33	
	Riverside County Regional Medical Center	298	27	9.06	11.08	9.71	6.01-14.58	
	San Geronio Memorial Hospital	61	9	14.75	11.02	15.88	6.48-30.26	
	Southwest Healthcare System – Murrieta	356	41	11.52	10.74	12.72	8.74-17.65	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Riverside (continued)	Temecula Valley Hospital	71	9	12.68	10.87	13.84	5.60-26.75	
Sacramento	Kaiser Foundation Hospital – Sacramento	389	46	11.83	12.52	11.20	7.89-15.24	
	Kaiser Foundation Hospital – South Sacramento	470	52	11.06	13.97	9.40	6.77-12.57	
	Mercy General Hospital	341	40	11.73	12.49	11.15	7.65-15.48	
	Mercy Hospital – Folsom	138	18	13.04	10.33	14.98	8.26-24.18	
	Mercy San Juan Hospital	689	80	11.61	11.53	11.95	9.22-15.13	
	Methodist Hospital of Sacramento	374	57	15.24	12.56	14.40	10.60-18.89	
	Sutter General Hospital	417	30	7.19	11.18	7.64	4.84-11.30	Better
	Sutter Memorial Hospital	141	17	12.06	12.16	11.76	6.36-19.25	
	UC Davis Medical Center	462	52	11.26	11.27	11.85	8.52-15.86	
San Benito	Hazel Hawkins Memorial Hospital	36	4	11.11	9.69	13.60	2.90-35.19	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
San Bernardino	Arrowhead Regional Medical Center	427	51	11.94	10.83	13.08	9.39-17.55	
	Barstow Community Hospital	93	10	10.75	12.58	10.14	4.32-19.19	
	Chino Valley Medical Center	65	7	10.77	12.98	9.85	3.40-20.80	
	Community Hospital of San Bernardino	31	5	16.13	11.26	17.00	4.59-38.62	
	Desert Valley Hospital	226	33	14.60	14.56	11.90	7.87-16.90	
	Hi-Desert Medical Center	44	7	15.91	11.45	16.49	5.81-33.49	
	Kaiser Foundation Hospital – Fontana	506	59	11.66	12.65	10.94	8.06-14.37	
	Loma Linda University Medical Center	514	45	8.76	11.27	9.22	6.42-12.68	
	Redlands Community Hospital	294	29	9.86	11.85	9.88	6.25-14.60	
	Saint Bernadine Medical Center	249	33	13.25	11.78	13.35	8.79-19.09	
Saint Mary Regional Medical Center	336	54	16.07	12.57	15.18	11.10-19.99		

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
San Bernardino (continued)	San Antonio Community Hospital	462	53	11.47	11.00	12.37	8.94-16.51	
	Victor Valley Global Medical Center	84	13	15.48	11.31	16.24	7.95-28.01	
San Diego	Alvarado Hospital	132	21	15.91	12.82	14.72	8.66-22.63	
	Grossmont Hospital	879	125	14.22	12.18	13.85	11.32-16.69	
	Kaiser Foundation Hospital – San Diego	499	50	10.02	11.73	10.14	7.23-13.69	
	Palomar Health Downtown Campus	751	72	9.59	10.57	10.76	8.14-13.86	
	Paradise Valley Hospital	97	14	14.43	13.78	12.42	6.28-21.04	
	Pomerado Hospital	170	12	7.06	9.94	8.43	3.89-15.46	
	Scripps Green Hospital	173	19	10.98	11.68	11.15	6.24-17.92	
	Scripps Memorial Hospital – Encinitas	322	30	9.32	11.14	9.93	6.32-14.61	
	Scripps Memorial Hospital – La Jolla	364	54	14.84	11.26	15.63	11.38-20.67	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
San Diego (continued)	Scripps Mercy Hospital	716	85	11.87	11.24	12.54	9.74-15.77	
	Sharp Chula Vista Medical Center	446	64	14.35	12.11	14.06	10.53-18.20	
	Sharp Coronado Hospital and Healthcare Center	40	6	15.00	11.46	15.52	4.88-33.34	
	Sharp Memorial Hospital	569	53	9.32	11.21	9.86	7.10-13.22	
	Tri-City Medical Center – Oceanside	489	57	11.66	11.03	12.54	9.18-16.57	
	UC San Diego Medical Center	343	50	14.58	11.16	15.50	11.13-20.73	
San Francisco	California Pacific Medical Center – Davies Campus	245	29	11.84	12.12	11.59	7.36-17.03	
	California Pacific Medical Center – Pacific Campus	322	37	11.49	12.26	11.12	7.48-15.67	
	California Pacific Medical Center – St. Luke’s Campus	48	3	6.25	11.84	6.26	0.93-19.33	
	Chinese Hospital	78	11	14.10	12.27	13.63	6.18-24.62	
	Kaiser Foundation Hospital – San Francisco	292	38	13.01	12.37	12.48	8.47-17.45	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2013-2014

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
San Francisco (continued)	Saint Francis Memorial Hospital	159	21	13.21	12.03	13.02	7.58-20.27	
	Saint Mary's Medical Center - San Francisco	132	13	9.85	12.10	9.66	4.66-17.09	
	San Francisco General Hospital	274	26	9.49	11.47	9.81	6.03-14.82	
	UC San Francisco Medical Center	323	42	13.00	11.09	13.91	9.63-19.15	
San Joaquin	Dameron Hospital	167	24	14.37	12.64	13.49	8.19-20.38	
	Doctors Hospital of Manteca	88	16	18.18	11.91	18.12	9.72-29.35	
	Kaiser Foundation Hospital - Manteca	134	12	8.96	13.96	7.61	3.54-13.77	
	Lodi Memorial Hospital	110	11	10.00	10.39	11.42	5.09-21.18	
	Saint Joseph's Medical Center of Stockton	378	43	11.38	11.44	11.79	8.19-16.23	
	San Joaquin General Hospital	160	20	12.50	10.92	13.58	7.75-21.46	
	Sutter Tracy Community Hospital	81	13	16.05	11.14	17.09	8.37-29.42	

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County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
San Luis Obispo	French Hospital Medical Center	89	7	7.87	10.80	8.64	2.95-18.64	
	Marian Regional Medical Center – Arroyo Grande	102	3	2.94	10.10	3.45	0.51-11.11	Better
	Sierra Vista Regional Medical Center	124	13	10.48	10.25	12.14	5.86-21.42	
	Twin Cities Community Hospital	173	26	15.03	10.21	17.46	10.83-25.97	
San Mateo	Kaiser Foundation Hospital – Redwood City	312	38	12.18	12.26	11.79	7.98-16.52	
	Kaiser Foundation Hospital – South San Francisco	196	27	13.78	13.36	12.23	7.66-18.10	
	Mills-Peninsula Medical Center	366	42	11.48	12.43	10.95	7.57-15.12	
	San Mateo Medical Center	45	2	4.44	9.91	5.32	0.40-20.63	
	Sequoia Hospital	124	18	14.52	10.82	15.92	8.82-25.53	
	Seton Medical Center	239	30	12.55	11.80	12.63	8.10-18.40	

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Statewide		67,888	8,055	11.87				
Santa Barbara	Lompoc Valley Medical Center	60	6	10.00	11.20	10.60	3.25-23.77	
	Marian Regional Medical Center	249	21	8.43	10.83	9.24	5.31-14.64	
	Santa Barbara Cottage Hospital	522	39	7.47	10.47	8.47	5.71-11.96	
Santa Clara	El Camino Hospital	367	29	7.90	10.73	8.74	5.50-13.00	
	Good Samaritan Hospital – San Jose	482	53	11.00	10.56	12.36	8.92-16.52	
	Kaiser Foundation Hospital – San Jose	313	39	12.46	13.15	11.24	7.67-15.66	
	Kaiser Foundation Hospital – Santa Clara	416	48	11.54	13.00	10.53	7.47-14.24	
	O'Connor Hospital	218	24	11.01	11.09	11.78	7.08-18.01	
	Regional Medical of San Jose	458	55	12.01	12.07	11.81	8.59-15.67	
	Saint Louise Regional Hospital	89	4	4.49	11.51	4.63	0.97-12.79	
	Santa Clara Valley Medical Center	384	55	14.32	11.13	15.27	11.14-20.18	
	Stanford Hospital	341	32	9.38	10.70	10.41	6.74-15.13	

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County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		67,888	8,055	11.87				
Santa Cruz	Dominican Hospital	278	28	10.07	10.23	11.68	7.31-17.39	
	Watsonville Community Hospital	90	7	7.78	11.81	7.81	2.68-16.77	
Shasta	Mercy Medical Center – Redding	327	37	11.32	11.44	11.73	7.90-16.53	
	Shasta Regional Medical Center	235	21	8.94	10.65	9.96	5.73-15.77	
Siskiyou	Fairchild Medical Center	58	2	3.45	9.70	4.22	0.32-16.71	
Solano	Kaiser Foundation Hospital – Rehabilitation Center Vallejo	338	42	12.43	14.33	10.29	7.13-14.17	
	Kaiser Foundation Hospital – Vacaville	181	17	9.39	12.81	8.70	4.67-14.40	
	North Bay Medical Center	260	27	10.39	12.78	9.64	6.01-14.38	
	Sutter Solano Medical Center	140	15	10.71	12.58	10.11	5.20-17.14	
Sonoma	Healdsburg District Hospital	34	4	11.77	9.55	14.62	3.12-37.67	
	Kaiser Foundation Hospital – Santa Rosa	251	21	8.37	12.29	8.07	4.64-12.80	

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Statewide		67,888	8,055	11.87				
Sonoma (continued)	Palm Drive Hospital	36	1	2.78	11.38	2.90	0.03-17.60	
	Petaluma Valley Hospital	71	7	9.86	11.10	10.53	3.62-22.43	
	Santa Rosa Memorial Hospital – Montgomery	310	22	7.10	11.27	7.47	4.34-11.78	Better
	Sonoma Valley Hospital	57	2	3.51	10.31	4.04	0.30-15.98	
	Sutter Medical Center of Santa Rosa	103	10	9.71	10.50	10.98	4.66-20.94	
Stanislaus	Doctors Medical Center	490	55	11.22	11.24	11.85	8.61-15.74	
	Emanuel Medical Center, Inc.	130	10	7.69	11.49	7.94	3.36-15.29	
	Memorial Hospital Medical Center – Modesto	484	75	15.50	11.73	15.67	12.04-19.86	Worse
	Oak Valley District Hospital	31	1	3.23	10.57	3.62	0.04-21.78	
Tehama	Saint Elizabeth Community Hospital	85	11	12.94	11.12	13.80	6.21-25.17	
Tulare	Kaweah Delta Medical Center	507	48	9.47	11.32	9.92	7.01-13.50	

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Statewide		67,888	8,055	11.87				
Tulare (continued)	Sierra View District Hospital	167	23	13.77	12.54	13.03	7.82-19.84	
	Tulare Regional Medical Center	42	7	16.67	12.16	16.27	5.72-33.01	
Tuolumne	Sonora Regional Medical Center – Greenley	131	13	9.92	11.07	10.63	5.13-18.81	
Ventura	Community Memorial Hospital – San Buenaventura	329	30	9.12	11.51	9.40	5.99-13.83	
	Los Robles Hospital and Medical Center	270	36	13.33	10.83	14.60	9.80-20.58	
	Saint John’s Pleasant Valley Hospital	118	9	7.63	11.36	7.96	3.18-15.83	
	Saint John’s Regional Medical Center	240	16	6.67	11.93	6.63	3.45-11.28	Better
	Simi Valley Hospital and Healthcare Services – Sycamore	139	19	13.67	12.28	13.21	7.44-20.99	
	Ventura County Medical Center	138	14	10.15	11.42	10.54	5.25-18.27	
Yolo	Sutter Davis Hospital	62	5	8.07	14.08	6.80	1.79-16.46	

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Statewide		67,888	8,055	11.87				
Yolo (continued)	Woodland Memorial Hospital	76	6	7.90	10.40	9.00	2.74-20.56	
Yuba	Rideout Memorial Hospital	315	35	11.11	12.15	10.85	7.21-15.44	

*A Hospital is classified as “Better” if the upper 98% Confidence Interval (CI) of the risk-adjusted rate falls below the California observed rate (11.87% for RARR). A hospital is classified as “Worse” if the lower 98% CI of the risk-adjusted rate is higher than the California observed rate. A hospital’s performance is classified as “As Expected” (rating is blank) if the California observed rate falls within the 98% CI of the hospital risk-adjusted rate.