OSHPD Technical Note for Producing Ischemic Stroke: Hospital Outcomes in California, 2011-2012

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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, we summarize 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 2011 and 2012 PDD files. To identify deaths that occurred after discharge, the PDD was matched to 2011 and 2012 California death certificate records (Death Statistical Master File) obtained from the California Department of Public Health, using patients' Social Security Numbers as the common identifier in both datasets.

Selection of Hospitals

A total of 321 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 hospital that was in effect at the time the services were provided. Some hospitals were excluded from performance reporting because they treated a small number of ischemic stroke cases. Table 1 shows 45 hospitals with fewer than 30 ischemic stroke admissions during 2011 - 2012. A total of 513 ischemic stroke patients were reported from these hospitals during the time period, with 59 deaths and 65 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 2011-2012

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
Butte	Biggs Gridley Memorial Hospital	15	3	1
Colusa	Colusa Regional Medical Center	17	3	1
Fresno	Adventist Medical Center - Reedley	23	2	0
Fresno	Coalinga Regional Medical Center	7	2	0
Fresno	Fresno Heart and Surgical Hospital	2	0	1
Glenn	Glenn Medical Center	5	0	2
Inyo	Northern Inyo Hospital	16	3	4
Kern	Kern Valley Healthcare District	6	1	2
Kings	Corcoran District Hospital	1	0	0
Lake	Saint Helena Hospital – Clearlake	13	3	0
Lassen	Banner Lassen Medical Center	8	2	1
Los Angeles	Bellflower Medical Center	13	0	0
Los Angeles	Coast Plaza Doctors Hospital	27	0	5
Los Angeles	East Valley Hospital Medical Center	16	0	2
Los Angeles	Hollywood Community Hospital	16	0	5
Los Angeles	Los Angeles Metropolitan Medical Center	12	0	5
Los Angeles	Motion Picture and Television Hospital	5	2	0
Los Angeles	Norwalk Community Hospital	22	1	4
Los Angeles	Silver Lake Medical Center – Downtown Campus	12	0	2
Los Angeles	Tri-City Regional Medical Center – Hawaiian Gardens	25	1	4

Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2011-2012

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
Mariposa	John C. Fremont Healthcare District	2	1	0
Merced	Memorial Hospital Los Banos	14	4	1
Modoc	Modoc Medical Center	7	1	0
Mono	Mammoth Hospital	2	0	0
Monterey	George L. Mee Memorial Hospital	14	2	3
Nevada	Tahoe Forest Hospital	24	1	2
Orange	Anaheim General Hospital	9	0	3
Orange	Chapman Medical Center	15	0	5
Orange	Mission Hospital Laguna Beach	15	3	2
Orange	Western Medical Center – Anaheim	15	2	1
Plumas	Eastern Plumas Hospital – Portola Campus	6	1	2
Plumas	Plumas District Hospital	2	1	0
Plumas	Seneca Healthcare District	5	3	1
Riverside	Loma Linda University Medical Center – Murrieta*	2	0	0
Riverside	Palo Verde Hospital	20	2	1
San Bernardino	Bear Valley Community Hospital	4	1	0
San Bernardino	Colorado River Medical Center	5	1	0
San Bernardino	Mountains Community Hospital	2	0	0
San Diego	Fallbrook Hospital District	17	0	1

Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2011-2012

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
Santa Barbara	Goleta Valley Cottage Hospital	2	2	0
Santa Barbara	Santa Ynez Valley Cottage Hospital	4	1	0
Shasta	Mayers Memorial Hospital	9	1	1
Siskiyou	Mercy Medical Center Mt. Shasta	24	3	2
Trinity	Trinity Hospital	5	0	0
Ventura	Ojai Valley Community Hospital	28	6	1

*This hospital reported incomplete data.

Selection of Patients

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

Inclusion Criteria

- Admission date between January 1, 2011 and November 30, 2012
- 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

We 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 sequale 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 2011 to 2012, slightly more women (51.43%) than men (48.57%) were admitted for ischemic strokes. Most patients were White non-Hispanic (56.04%) followed by Hispanic (18.72%), Asian/Pacific Islander (10.63%), andBlack (10.08%). Ischemic strokes occur most often in adults 65 years of age and older, who accounted for 70.09% of ischemic stroke patients (Table 3).

Table 3. Demographic Characteristics of Ischemic Stroke Patients

	Number	Percent (%)
Statewide	70,213	
SEX		
Male	34,101	48.57
Female	36,112	51.43
AGE GROUP		
18-44	2,415	3.44
45-64	18,588	26.47
65+	49,210	70.09
RACE/ETHNICITY		
White	40,051	57.04
Black	7,079	10.08
Hispanic	13,144	18.72
Asian/Pacific Islander	7,461	10.63
Other	2,478	3.53
EXPECTED PAYER		
Medicare	47,116	67.10
Medi-Cal	6,440	9.17
Private	11,533	16.43
Self Pay	2,522	3.59
Other	2,602	3.72

Risk-Adjustment Models

Table 4 shows the parameter estimates, odds ratios (ORs), and confidence intervals (CIs) for the risk factors in the 2011-2012 ischemic stroke 30-day mortality model. The strongest predictors of death were: diagnosis of metastatic cancer (OR=9.390), cardiopulmonary arrest (OR=6.800), decreased consciousness/altered mental status/coma (OR=4.762), and acquired immune deficiency syndrome (OR=4.452). Several conditions (e.g., hypertension) 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 diseases[1].

[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	-7.457	0.125	<.0001		
Age (Years)	0.057	0.001	<.0001	1.059	1.056-1.062
Male	-0.067	0.030	0.023	0.935	0.882-0.991
Black	-0.536	0.061	<.0001	0.585	0.519-0.659
Hispanic	-0.228	0.041	<.0001	0.796	0.734-0.863
Asian	-0.358	0.050	<.0001	0.699	0.634-0.771
Other Race/Ethnicity	-0.091	0.079	0.250	0.913	0.783-1.066
Emergency Department (ED) Transfer	0.151	0.066	0.023	1.163	1.021-1.324
Hospital - Hospital (HH) Transfer	0.239	0.063	0.000	1.270	1.122-1.438
ED + HH Transfer	-0.201	0.239	0.400	0.818	0.512-1.307
Source of Admission-Skilled Nursing	0.647	0.045	<.0001	1.910	1.748-2.087
Source of Admission- Other	0.249	0.085	0.003	1.283	1.086-1.515
Aphasia	0.249	0.032	<.0001	1.283	1.205-1.366
Hemiplegia/Hemiparesis	0.298	0.039	<.0001	1.347	1.248-1.453
Other Paralysis	-0.064	0.140	0.649	0.938	0.714-1.234
Hemineglect	0.212	0.103	0.039	1.236	1.011-1.512
Vision Loss	-0.353	0.082	<.0001	0.703	0.598-0.826
Apraxia	-0.382	0.222	0.086	0.683	0.442-1.055
Decreased Consciousness, Altered Mental Status, Coma	1.561	0.053	<.0001	4.762	4.289-5.288
Seizure or Seizure Disorder	0.516	0.054	<.0001	1.675	1.507-1.862

Table 4. Parameters for 30-Day Mortality Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Conjugate Deviation of Eyes	-0.009	0.403	0.982	0.991	0.450-2.185
Other Cerebral Ischemic Signs or Symptoms	-0.282	0.110	0.010	0.754	0.608-0.936
Perenteral Nutrition	0.321	0.169	0.057	1.378	0.990-1.919
Dysphagia	0.164	0.035	<.0001	1.178	1.099-1.261
Admission Elevated Glucose	-0.155	0.088	0.077	0.856	0.721-1.017
Acute Myocardial Infarction	0.801	0.074	<.0001	2.227	1.926-2.575
Left–sided Valvular Heart Disease	-0.218	0.113	0.054	0.804	0.645-1.004
Right–sided Valvular Heart Disease	-0.347	0.101	0.001	0.707	0.580-0.862
Atrial Fibrillation	0.502	0.030	<.0001	1.651	1.558-1.750
Cardiopulmonary Arrest	1.917	0.058	<.0001	6.800	6.075-7.612
Systolic Heart Failure	-0.785	0.593	0.186	0.456	0.143-1.458
History of CHF (Left Heart Failure, Cardiomyopathy)	0.290	0.035	<.0001	1.336	1.249-1.431
Any Ischemic Heart Disease: CAD, Angina, AMI, prior MI	0.037	0.033	0.265	1.037	0.973-1.106
Dementia or Alzheimer's Disease	0.222	0.048	<.0001	1.249	1.136-1.373
Low Platelet Count	0.208	0.178	0.244	1.231	0.868-1.747
Bleeding Disorders (no platelet disorders)	0.767	0.171	<.0001	2.153	1.539-3.012
Anticoagulation*					
Hypercoagulable State	0.263	0.162	0.103	1.301	0.948-1.786
Falls	-0.011	0.063	0.864	0.989	0.874-1.120

Table 4. Parameters for 30-Day Mortality Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Current Smoker	-0.082	0.041	0.049	0.922	0.850-1.000
Recurrent Strokes	0.204	0.052	<.0001	1.226	1.107-1.358
Former TIA	-0.147	0.087	0.091	0.864	0.729-1.023
TIA Resolved	0.109	0.047	0.020	1.115	1.017-1.222
Fever 48 h	0.580	0.119	<.0001	1.786	1.415-2.254
Pulmonary Circulation Disease	0.114	0.070	0.105	1.120	0.976-1.286
Peripheral Vascular Disease	0.027	0.044	0.539	1.027	1.056-1.062
Hypertension	-0.094	0.036	0.008	0.910	0.882-0.991
Paralysis	0.740	0.044	<.0001	2.095	0.519-0.659
Chronic Pulmonary Disease	0.063	0.038	0.100	1.065	0.734-0.863
Diabetes w/o Chronic Complications	0.020	0.035	0.578	1.020	0.634-0.771
Diabetes w/ Chronic Complications	-0.101	0.056	0.072	0.904	0.783-1.066
Renal Failure	0.162	0.037	<.0001	1.175	1.021-1.324
Liver Disease	0.210	0.119	0.077	1.233	1.122-1.438
Chronic Peptic Ulcer Disease	-0.152	0.674	0.822	0.859	0.512-1.307
Acquired Immune Deficiency Syndrome	1.493	0.609	0.014	4.452	1.748-2.087
Lymphoma	0.794	0.177	<.0001	2.211	1.086-1.515
Metastatic Cancer	2.240	0.080	<.0001	9.390	1.205-1.366
Solid Tumor w/out Metastasis	0.539	0.090	<.0001	1.714	1.248-1.453

Table 4. Parameters for 30-Day Mortality Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Rheumatoid Arthritis/Collagen Vas	-0.008	0.087	0.927	0.992	0.714-1.234
Weight Loss	0.264	0.062	<.0001	1.302	1.011-1.512
Fluid and Electrolyte Disorders	0.339	0.034	<.0001	1.403	0.598-0.826
Chronic Blood Loss Anemia	-0.484	0.210	0.021	0.617	0.442-1.055
Deficiency Anemia	-0.146	0.037	<.0001	0.864	4.289-5.288
Alcohol Abuse	0.194	0.081	0.016	1.214	1.507-1.862
Drug Abuse	0.092	0.122	0.450	1.096	0.450-2.185
Psychoses	0.011	0.074	0.884	1.011	0.608-0.936

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

Table 5 shows the parameter estimates, ORs, and CIs for the risk factors in the 2011-2012 ischemic stroke 30-day readmissions model. Due to a large number of nonsignificant risk factors that were included in the original full model, we used stepwise logistic regression to retain those significant risk factors (P< 0.05). The strongest predictors of 30-day readmissions were: diagnosis of metastatic cancer (OR=2.008), solid tumor without metastasis (OR=1.515), cardiopulmonary arrest (OR=1.483), bleeding disorders (no platelet disorders) (OR=1.473) and Hospital-Hospital (HH) transfer (OR=1.414).

Table 5. Parameters for Readmission Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Intercept	-2.706	0.070	<.0001		
Age (Years)	0.002	0.001	0.015	1.002	1.004-1.004
Black	0.230	0.039	<.0001	1.259	1.168-1.358
Hispanic	0.155	0.032	<.0001	1.167	1.097-1.242
Asian	0.124	0.039	0.002	1.132	1.048-1.222

Table 5. Parameters for Readmission Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Hospital - Hospital Transfer	0.346	0.053	<.0001	1.414	1.274-1.569
ED + HH Transfer	0.470	0.183	0.010	1.600	1.119-2.289
Hemineglect	-0.245	0.120	0.041	0.783	0.619-0.990
Vision Loss	0.190	0.062	0.002	1.210	1.071-1.366
Seizure or Seizure Disorder	0.194	0.049	<.0001	1.214	1.102-1.337
Perenteral Nutrition	0.352	0.174	0.043	1.423	1.012-2.000
Dysphagia	0.219	0.033	<.0001	1.244	1.167-1.327
Acute Myocardial Infarction	0.159	0.080	0.047	1.172	1.002-1.370
Cardiopulmonary Arrest	0.394	0.078	<.0001	1.483	1.274-1.726
History of CHF (L Heart Failure, Cardiomyopathy)	0.215	0.032	<.0001	1.240	1.164-1.320
Any Ischemic Heart Disease: CAD, Angina, AMI, prior MI	0.127	0.028	<.0001	1.135	1.074-1.200
Bleeding Disorders (no platelet disorders)	0.388	0.174	0.026	1.473	1.048-2.071
Recurrent Strokes	0.177	0.043	<.0001	1.193	1.096-1.299
TIA Resolved	0.263	0.040	<.0001	1.300	1.204-1.405
Fever 48 hr	0.251	0.119	0.035	1.285	1.018-1.622

Table 5. Parameters for Readmission Model

Risk Variables	Coefficient	Standard Error	P Value	Odds Ratio	95% CI for Odds Ratio
Pulmonary Circulation Disease	0.189	0.065	0.004	1.208	1.064-1.372
Peripheral Vascular Disease	0.111	0.038	0.004	1.117	1.037-1.203
Hypertension	0.090	0.030	0.003	1.094	1.031-1.161
Paralysis	0.224	0.033	<.0001	1.252	1.172-1.336
Chronic Pulmonary Disease	0.219	0.033	<.0001	1.244	1.167-1.326
Diabetes w/o Chronic Complications	0.164	0.028	<.0001	1.178	1.115-1.244
Diabetes w/ Chronic Complications	0.154	0.041	0.000	1.167	1.076-1.265
Renal Failure	0.241	0.032	<.0001	1.273	1.195-1.355
Liver Disease	0.295	0.084	0.001	1.343	1.139-1.584
Metastatic Cancer	0.697	0.088	<.0001	2.008	1.691-2.386
Solid Tumor w/o Metastasis	0.416	0.084	<.0001	1.515	1.284-1.788
Weight Loss	0.134	0.061	0.028	1.143	1.015-1.287
Fluid and Electrolyte Disorders	0.190	0.031	<.0001	1.210	1.139-1.285
Chronic Blood Loss Anemia	0.327	0.159	0.039	1.387	1.016-1.894
Deficiency Anemia	0.247	0.031	<.0001	1.280	1.203-1.361
Psychoses	0.197	0.057	0.001	1.217	1.088-1.362

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 2011-2012 mortality risk model, the C-statistic was 0.842, which is generally considered excellent model discrimination. For the readmission risk model, the C-statistic was 0.626, 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 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 overpredicts readmissions for Risk Group 1, 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 readmission cases at the extremes.

Table 6. Calibration of Risk Model for 30-Day Mortality, 2011-2012

Risk Group	Ischemic Stroke Cases	Observed Deaths	Predicted Deaths	Difference	95% CI of Predicted Deaths
1	7,020	43	52.46	9.46	(43.42,66.78)
2	7,021	85	102.51	17.51	(86.07,122.88)
3	7,021	102	156.84	54.84	(132.23,187.16)
4	7,033	165	226.59	61.59	(191.55,269.71)
5	7,009	252	318.41	66.41	(270.10,377.31)
6	7,021	366	442.46	76.46	(375.73,523.31)
7	7,021	596	616.72	20.72	(523.89,727.89)
8	7,021	1,004	890.52	-113.48	(756.84,1048.48)
9	7,021	1,710	1,414.86	-295.14	(1205.38,1656.03)
10	7,025	3,080	3,184.62	104.62	(2839.84,3536.34)
	70,213	**7,403**	**7,406**	**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, 2011-2012

Risk Group	Ischemic Stroke Cases	Observed Readmissions	Predicted Readmissions	Difference	95% CI of Predicted Readmissions
1	6,678	425	500.98	75.98	(471.57,532.40)
2	6,648	520	556.30	36.3	(519.10,596.21)
3	6,679	601	610.51	9.51	(566.97,657.33)
4	6,642	643	657.18	14.18	(604.88,713.85)
5	6,659	741	716.29	-24.71	(653.00,785.47)
6	6,659	827	783.23	-43.77	(708.57,865.35)
7	6,661	905	869.76	-35.24	(780.22,968.83)
8	6,661	1,047	988.23	-58.77	(878.98,1109.57)
9	6,661	1,235	1,175.63	-59.37	(1034.68,1332.80)
10	6,664	1,582	1,668.92	86.92	(1444.36,1916.41)
	66,612	**8,526**	**8,527.03**	**1.03**	

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 2011-2012 hospital 30-day mortality rate of 10.55% and the 30-day readmission rate of 12.80%. 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 rate[2]. 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 4.5) 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 exludes 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 deaths 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 our 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 70,213 ischemic stroke patients admitted to 321 California hospitals between January 1, 2011 and November 30, 2012, 7,403 patients died within 30 days of the index admission, reflecting an overall statewide 30-day mortality rate of 10.55% (Table 8). The observed 30-day mortality rates at California hospitals ranged from 0% to 25.00%. The expected 30-day mortality rate, calculated by the risk model to reflect patients' demographics and severity of illness, varied between 1.99% and 20.24%. The 30-day RAMRs, which evaluate hospital performance, ranged from 0% to 24.57%. Among the 10 hospitals rated "Worse" than expected, the average RAMR was 17.79% (range: 14.36 – 24.57%), more than three times the average RAMR for the nine hospitals rated "Better" than expected (average 5.29%; range: 2.60 - 7.45%).

Risk-adjusted 30-day readmission rates: Among the 66,612 ischemic stroke patients discharged from 321 California hospitals between January 1, 2011 and November 30, 2012, 8,527 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 12.80% (Table 9). The observed 30-day readmission rates at California hospitals ranged from 0% to 28.57%. The expected 30-day readmission rate, calculated by the risk model to reflect patients' demographics and severity of illness, varied between 9.98% and 17.11%. The 30-day RARRs ranged from 0% to 26.14%. Among the seven hospitals rated "Worse" than expected, the average RARR was 18.58% (range: 15.80 – 22.37%), almost three times the average RARR for the 12 hospitals rated "Better" than expected (average 6.68%; range: 1.93 – 8.87%).

GUIDE TO INTERPRETING TABLES 8 & 9: HOSPITAL RISK-ADJUSTED OUTCOMES RESULTS, 2011-2012	
Ischemic Stroke Cases	The total number of acute ischemic stroke cases submitted to PDD for 2011-2012.
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, 2011-2012	
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, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Alameda	Alameda County Medical Center – Highland Campus	205	9	4.39	3.17	14.63	6.05-28.15	
	Alameda Hospital	95	12	12.63	10.90	12.22	6.08-20.51	
	Alta Bates Summit Medical Center – Alta Bates Campus	287	24	8.36	8.98	9.83	6.07-14.68	
	Alta Bates Summit Medical Center – Summit Campus – Hawthorne	462	44	9.52	10.86	9.25	6.66-12.34	
	Eden Medical Center	399	53	13.28	11.33	12.36	9.20-16.03	
	Kaiser Foundation Hospital – Hayward	384	49	12.76	12.56	10.72	7.93-13.96	
	Kaiser Foundation Hospital – Oakland Campus	563	44	7.82	11.07	7.45	5.39-9.92	Better
	Saint Rose Hospital	108	12	11.11	9.99	11.73	6.10-19.47	
	San Leandro Hospital	76	8	10.53	10.87	10.22	4.05-19.69	
	Valleycare Medical Center	119	10	8.40	9.47	9.36	4.26-17.01	
	Washington Hospital – Fremont	357	42	11.77	13.18	9.42	6.82-12.45	
Amador	Sutter Amador Hospital	105	14	13.33	12.40	11.34	6.06-18.47	

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Statewide		**70,213**	**7,406**	**10.55**				
Butte	Enloe Medical Center – Esplanade Campus	435	41	9.43	12.38	8.03	5.70-10.86	
	Feather River Hospital	139	12	8.63	12.81	7.11	3.63-12.10	
	Oroville Hospital	176	10	5.68	7.37	8.13	3.65-15.13	
Calaveras	Mark Twain Saint Joseph's Hospital	56	9	16.07	13.22	12.82	5.75-22.79	
Contra Costa	Contra Costa Regional Medical Center	111	7	6.31	4.77	13.94	4.92-28.95	
	Doctors Medical Center – San Pablo	251	27	10.76	10.88	10.43	6.81-14.94	
	John Muir Medical Center – Concord Campus	300	32	10.67	12.06	9.33	6.31-13.04	
	John Muir Medical Center – Walnut Creek Campus	408	55	13.48	16.35	8.69	6.53-11.19	
	Kaiser Foundation Hospital – Antioch	208	28	13.46	13.85	10.25	6.79-14.44	
	Kaiser Foundation Hospital – Walnut Creek	344	45	13.08	15.07	9.16	6.64-12.12	
	San Ramon Regional Medical Center	123	12	9.76	10.78	9.55	4.64-16.51	
	Sutter Delta Medical Center	180	17	9.44	12.89	7.73	4.45-12.00	

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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		**70,213**	**7,406**	**10.55**				
Del Norte	Sutter Coast Hospital	87	6	6.90	11.39	6.39	2.00-14.04	
El Dorado	Barton Memorial Hospital	39	5	12.82	9.48	14.26	4.15-30.71	
	Marshall Medical Center	177	31	17.51	16.06	11.50	7.97-15.69	
Fresno	Clovis Community Medical Center	169	13	7.69	7.88	10.29	5.24-17.49	
	Community Regional Medical Center – Fresno	677	62	9.16	7.74	12.48	9.51-15.92	
	Kaiser Foundation Hospital – Fresno	319	42	13.17	11.30	12.29	8.79-16.47	
	Saint Agnes Medical Center	793	101	12.74	10.67	12.60	10.24-15.23	
Humboldt	Mad River Community Hospital	51	8	15.69	9.30	17.79	7.05-33.42	
	Redwood Memorial Hospital	41	10	24.39	16.26	15.82	7.32-26.73	
	Saint Joseph Hospital – Eureka	192	29	15.10	12.51	12.74	8.48-17.95	
Imperial	El Centro Regional Medical Center	204	23	11.28	9.20	12.92	8.15-19.06	
	Pioneers Memorial Healthcare District	152	8	5.26	7.79	7.13	2.85-14.09	
Kern	Bakersfield Heart Hospital	100	4	4.00	7.96	5.30	1.15-13.81	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Kern (continued)	Bakersfield Memorial Hospital	298	34	11.41	8.54	14.09	9.61-19.57	
	Delano Regional Medical Center	34	6	17.65	11.58	16.07	5.82-31.45	
	Kern Medical Center	51	1	1.96	1.99	10.42	0.10-63.77	
	Mercy Hospital – Bakersfield	180	27	15.00	10.22	15.48	10.14-21.93	
	Ridgecrest Regional Hospital	36	9	25.00	10.73	24.57	11.25-42.00	Worse
	San Joaquin Community Hospital	672	76	11.31	8.08	14.77	11.53-18.46	Worse
Kings	Adventist Medical Center	216	24	11.11	10.58	11.08	6.99-16.24	
Lake	Sutter Lakeside Hospital	57	10	17.54	15.11	12.24	5.55-21.49	
Los Angeles	Alhambra Hospital	100	5	5.00	11.38	4.63	1.29-10.80	
	Antelope Valley Hospital	431	41	9.51	8.14	12.33	8.71-16.68	
	Beverly Hospital	159	19	11.95	9.24	13.65	8.03-20.96	
	Brotman Medical Center	142	8	5.63	8.40	7.07	2.82-13.98	
	California Hospital Medical Center – Los Angeles	188	9	4.79	6.39	7.91	3.41-14.88	

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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		**70,213**	**7,406**	**10.55**				
Los Angeles (continued)	Cedars Sinai Medical Center	773	56	7.25	12.51	6.11	4.55-7.95	Better
	Centinela Hospital Medical Center	503	20	3.98	5.77	7.28	4.15-11.58	
	Citrus Valley Medical Center – Inter-Community Campus	177	13	7.35	10.36	7.48	3.88-12.70	
	Citrus Valley Medical Center – Queen of the Valley Campus	234	22	9.40	8.75	11.33	7.09-16.76	
	Community and Mission Hospital of Huntington Park – Slauson	49	0	0.00	3.37	0.00	0.00-26.87	
	Community Hospital of Long Beach	64	11	17.19	13.30	13.63	6.88-22.36	
	Downey Regional Medical Center	255	26	10.20	10.07	10.68	6.90-15.42	
	East Los Angeles Doctors Hospital	38	0	0.00	7.18	0.00	0.00-14.58	
	Encino Hospital Medical Center	39	2	5.13	20.24	2.67	0.22-9.05	Better
	Foothill Presbyterian Hospital – Johnston Memorial	128	15	11.72	10.20	12.12	6.60-19.53	
	Garfield Medical Center	315	14	4.44	10.78	4.35	2.26-7.31	Better
	Glendale Adventist Medical Center – Wilson Terrace	359	48	13.37	14.06	10.03	7.42-13.09	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Los Angeles (continued)	Glendale Memorial Hospital and Medical Center	210	17	8.10	8.93	9.57	5.30-15.38	
	Good Samaritan Hospital – Los Angeles	202	14	6.93	8.66	8.44	4.40-14.20	
	Greater El Monte Community Hospital	43	2	4.65	10.13	4.84	0.39-16.51	
	Henry Mayo Newhall Memorial Hospital	234	21	8.97	11.25	8.41	5.18-12.61	
	Hollywood Presbyterian Medical Center	256	22	8.59	10.77	8.42	5.23-12.53	
	Huntington Memorial Hospital	514	56	10.90	11.24	10.23	7.70-13.18	
	Kaiser Foundation Hospital – Baldwin Park	323	30	9.29	8.17	12.00	7.96-17.08	
	Kaiser Foundation Hospital – Downey	367	22	6.00	6.41	9.87	5.97-15.09	
	Kaiser Foundation Hospital – Panorama City	269	30	11.15	9.02	13.04	8.62-18.53	
	Kaiser Foundation Hospital – South Bay	268	26	9.70	8.00	12.79	8.13-18.73	
	Kaiser Foundation Hospital – Sunset	443	33	7.45	7.38	10.64	7.13-15.03	
	Kaiser Foundation Hospital – West Los Angeles	319	26	8.15	6.84	12.56	7.93-18.49	

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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		**70,213**	**7,406**	**10.55**				
Los Angeles (continued)	Kaiser Foundation Hospital – Woodland Hills	281	31	11.03	13.61	8.55	5.73-12.00	
	Keck Hospital of University of Southern California	68	11	16.18	10.87	15.70	8.08-26.61	
	Lakewood Regional Medical Center	323	30	9.29	8.55	11.46	7.56-16.37	
	Long Beach Memorial Medical Center	651	66	10.14	7.83	13.65	10.50-17.31	
	Los Angeles Community Hospital	59	2	3.39	10.61	3.37	0.26-12.51	
	Los Angeles County/Harbor – UCLA Medical Center	297	9	3.03	3.08	10.39	4.46-20.13	
	Los Angeles County/Olive View – UCLA Medical Center	171	3	1.75	2.25	8.22	1.21-26.21	
	Los Angeles County/University of Southern California Medical Center	211	18	8.53	4.12	21.86	12.66-34.26	Worse
	Marina Del Rey Hospital	93	6	6.45	10.57	6.44	2.04-14.08	
	Memorial Hospital of Gardena	108	4	3.70	5.77	6.77	1.56-17.45	
	Methodist Hospital of Southern California	582	68	11.68	11.28	10.93	8.42-13.81	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Los Angeles (continued)	Mission Community Hospital – Panorama Campus	45	3	6.67	11.44	6.15	0.98-17.05	
	Monterey Park Hospital	60	4	6.67	8.55	8.23	1.83-20.85	
	Northridge Hospital Medical Center	353	39	11.05	12.84	9.08	6.41-12.29	
	Olympia Medical Center	102	10	9.80	10.88	9.50	4.26-17.15	
	Pacific Alliance Medical Center, Inc.	88	2	2.27	9.21	2.60	0.20-9.85	Better
	Pacific Hospital of Long Beach	45	5	11.11	10.06	11.65	3.55-25.35	
	Pacifica Hospital of the Valley	33	2	6.06	12.76	5.01	0.41-16.17	
	Palmdale Regional Medical Center	181	19	10.50	8.85	12.52	7.53-19.11	
	Pomona Valley Hospital Medical Center	580	54	9.31	10.64	9.23	6.89-12.00	
	Presbyterian Intercommunity Hospital	538	63	11.71	12.49	9.89	7.55-12.60	
	Providence Holy Cross Medical Center	371	34	9.16	10.39	9.31	6.34-12.98	
	Providence Little Company of Mary Medical Center – San Pedro	189	29	15.34	12.46	12.99	8.67-18.17	
	Providence Little Company of Mary Medical Center – Torrance	550	59	10.73	9.67	11.70	8.86-15.02	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Los Angeles (continued)	Providence Saint Joseph Medical Center	588	69	11.74	12.67	9.77	7.59-12.26	
	Providence Tarzana Medical Center	310	25	8.07	12.73	6.68	4.17-9.93	Better
	Ronald Reagan UCLA Medical Center	482	53	11.00	13.60	8.53	6.43-10.97	
	Saint Francis Medical Center	223	15	6.73	9.64	7.36	4.04-11.91	
	Saint John's Health Center	170	20	11.77	13.70	9.06	5.53-13.66	
	Saint Mary Medical Center	198	18	9.09	9.47	10.12	5.82-15.85	
	Saint Vincent Medical Center	174	6	3.45	8.21	4.43	1.37-10.06	Better
	San Dimas Community Hospital	78	11	14.10	11.86	12.54	6.26-21.31	
	San Gabriel Valley Medical Center	160	11	6.88	12.08	6.00	2.84-10.69	
	Santa Monica – UCLA Medical Center and Orthopedic Hospital	199	16	8.04	13.08	6.49	3.64-10.41	Better
	Sherman Oaks Hospital	66	9	13.64	17.20	8.37	3.72-14.95	
	Temple Community Hospital	53	3	5.66	9.73	6.14	0.96-17.67	
	Torrance Memorial Medical Center	596	61	10.24	11.51	9.38	7.12-12.00	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Los Angeles (continued)	Valley Presbyterian Hospital	209	26	12.44	11.60	11.31	7.33-16.25	
	Verdugo Hills Hospital	116	11	9.48	9.67	10.34	4.69-18.71	
	West Hills Hospital and Medical Center	209	28	13.40	11.41	12.38	8.10-17.64	
	White Memorial Medical Center	432	29	6.71	10.42	6.80	4.47-9.75	Better
	Whittier Hospital Medical Center	110	5	4.55	10.41	4.60	1.26-10.76	
Madera	Madera Community Hospital	67	10	14.93	8.74	18.00	8.18-31.67	
Marin	Kaiser Foundation Hospital – San Rafael	208	21	10.10	11.99	8.88	5.34-13.52	
	Marin General Hospital	255	33	12.94	14.77	9.25	6.32-12.82	
	Novato Community Hospital	42	10	23.81	17.10	14.69	7.15-24.45	
Mendocino	Frank R. Howard Memorial Hospital	31	4	12.90	15.97	8.52	2.02-20.02	
	Mendocino Coast District Hospital	49	5	10.20	10.72	10.04	2.86-22.68	
	Ukiah Valley Medical Center	104	14	13.46	10.80	13.14	7.01-21.37	
Merced	Mercy Medical Center – Merced	273	38	13.92	13.45	10.92	7.78-14.64	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Monterey	Community Hospital Monterey Peninsula	312	32	10.26	10.42	10.39	6.91-14.68	
	Natividad Medical Center	53	2	3.77	3.22	12.35	0.94-45.92	
	Salinas Valley Memorial Hospital	294	19	6.46	9.56	7.13	4.12-11.21	
Napa	Queen of the Valley Hospital – Napa	189	35	18.52	13.73	14.22	9.84-19.40	
	Saint Helena Hospital	87	7	8.05	10.12	8.39	2.97-17.37	
Nevada	Sierra Nevada Memorial Hospital	198	26	13.13	14.21	9.75	6.32-14.06	
Orange	AHMC Anaheim Regional Medical Center	255	22	8.63	8.60	10.58	6.44-16.01	
	Coastal Communities Hospital	30	4	13.33	9.55	14.73	3.70-33.14	
	Fountain Valley Regional Hospital and Medical Center – Euclid	464	39	8.41	11.09	8.00	5.67-10.83	
	Garden Grove Hospital and Medical Center	91	6	6.59	10.18	6.83	2.43-14.21	
	Hoag Memorial Hospital Presbyterian	812	84	10.35	11.45	9.53	7.58-11.75	
	Huntington Beach Hospital	65	6	9.23	11.87	8.20	2.70-17.30	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Orange (continued)	Kaiser Foundation Hospital – Anaheim	370	28	7.57	7.90	10.10	6.42-14.80	
	La Palma Intercommunity Hospital	81	3	3.70	7.27	5.37	0.82-16.09	
	Los Alamitos Medical Center	454	57	12.56	11.80	11.22	8.45-14.44	
	Mission Hospital Regional Medical Center	508	60	11.81	12.27	10.15	7.70-12.99	
	Orange Coast Memorial Medical Center	208	20	9.62	10.38	9.77	5.83-14.96	
	Placentia Linda Hospital	78	7	8.97	8.75	10.82	4.02-22.03	
	Saddleback Memorial Medical Center	440	66	15.00	15.13	10.46	8.08-13.18	
	Saint Joseph Hospital – Orange	454	42	9.25	10.51	9.28	6.56-12.57	
	Saint Jude Medical Center	519	51	9.83	12.77	8.11	6.02-10.60	
	UC Irvine Medical Center	354	47	13.28	9.65	14.52	10.68-18.99	Worse
	West Anaheim Medical Center	148	12	8.11	10.41	8.21	3.92-14.43	
	Western Medical Center – Santa Ana	172	23	13.37	9.55	14.77	9.20-21.77	
Placer	Kaiser Foundation Hospital – Roseville	476	57	11.98	13.53	9.33	7.05-11.98	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Placer (continued)	Sutter Auburn Faith Hospital	180	23	12.78	12.96	10.40	6.46-15.41	
	Sutter Roseville Medical Center	466	66	14.16	12.07	12.38	9.56-15.59	
Riverside	Corona Regional Medical Center – Main	154	22	14.29	10.06	14.97	9.28-22.11	
	Desert Regional Medical Center	453	46	10.16	9.78	10.95	7.95-14.53	
	Eisenhower Medical Center	826	98	11.86	9.66	12.95	10.42-15.81	
	Hemet Valley Medical Center	412	73	17.72	14.54	12.85	10.15-15.90	
	John F. Kennedy Memorial Hospital	120	14	11.67	9.29	13.24	7.40-21.45	
	Kaiser Foundation Hospital – Moreno Valley	93	9	9.68	8.88	11.49	4.77-21.78	
	Kaiser Foundation Hospital – Riverside	225	16	7.11	7.83	9.58	5.22-15.65	
	Menifee Valley Medical Center	122	24	19.67	13.76	15.08	9.76-21.55	
	Parkview Community Hospital Medical Center	154	20	12.99	9.87	13.88	8.42-20.91	
	Riverside Community Hospital	458	43	9.39	9.28	10.67	7.62-14.33	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Riverside (continued)	Riverside County Regional Medical Center	289	21	7.27	5.82	13.18	8.25-19.74	
	San Gorgonio Memorial Hospital	113	18	15.93	12.47	13.47	8.08-20.36	
	Southwest Healthcare System – Murrieta	426	50	11.74	9.31	13.30	9.76-17.49	
Sacramento	Kaiser Foundation Hospital – Sacramento	451	64	14.19	12.31	12.16	9.44-15.25	
	Kaiser Foundation Hospital – South Sacramento	448	44	9.82	11.05	9.37	6.86-12.36	
	Mercy General Hospital	339	44	12.98	10.71	12.78	9.33-16.86	
	Mercy Hospital – Folsom	120	9	7.50	8.67	9.12	3.83-17.35	
	Mercy San Juan Hospital	642	84	13.08	13.26	10.41	8.32-12.76	
	Methodist Hospital of Sacramento	323	22	6.81	8.99	7.99	4.82-12.12	
	Sutter General Hospital	387	47	12.15	9.94	12.89	9.46-16.93	
	Sutter Memorial Hospital	172	14	8.14	9.38	9.15	4.75-15.30	
	UC Davis Medical Center	397	37	9.32	7.44	13.22	9.24-18.06	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
San Benito	Hazel Hawkins Memorial Hospital	48	9	18.75	8.94	22.12	9.89-39.07	
San Bernardino	Arrowhead Regional Medical Center	433	25	5.77	3.89	15.65	9.71-23.42	
	Barstow Community Hospital	61	3	4.92	5.56	9.32	1.42-27.65	
	Chino Valley Medical Center	107	5	4.67	6.48	7.61	2.06-18.16	
	Community Hospital of San Bernardino	68	7	10.29	7.04	15.43	6.00-30.65	
	Desert Valley Hospital	223	17	7.62	9.70	8.29	4.58-13.38	
	Hi-Desert Medical Center	111	18	16.22	9.25	18.50	10.83-28.33	Worse
	Kaiser Foundation Hospital – Fontana	476	37	7.77	8.84	9.27	6.43-12.76	
	Loma Linda University Medical Center	534	61	11.42	10.51	11.47	8.74-14.62	
	Montclair Hospital Medical Center	36	0	0.00	6.35	0.00	0.00-16.95	Better
	Redlands Community Hospital	271	29	10.70	11.82	9.55	6.30-13.56	
	Saint Bernadine Medical Center	293	27	9.22	7.75	12.54	8.10-18.17	
	Saint Mary Regional Medical Center	416	23	5.53	6.88	8.48	5.12-12.98	
	San Antonio Community Hospital	462	42	9.09	7.87	12.19	8.63-16.53	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
San Bernardino (continued)	Victor Valley Community Hospital	87	2	2.30	6.14	3.95	0.32-14.00	
San Diego	Alvarado Hospital	184	14	7.61	11.62	6.91	3.66-11.46	
	Grossmont Hospital	865	105	12.14	10.98	11.66	9.52-14.05	
	Kaiser Foundation Hospital – San Diego	531	50	9.42	9.23	10.77	7.87-14.21	
	Palomar Heath Downtown Campus	574	89	15.51	12.68	12.90	10.42-15.70	
	Paradise Valley Hospital	145	9	6.21	7.09	9.24	3.80-17.72	
	Pomerado Hospital	239	41	17.16	13.17	13.74	9.90-18.20	
	Scripps Green Hospital	205	16	7.81	10.52	7.83	4.25-12.86	
	Scripps Memorial Hospital – Encinitas	301	41	13.62	16.71	8.60	6.20-11.44	
	Scripps Memorial Hospital – La Jolla	383	49	12.79	14.82	9.11	6.72-11.90	
	Scripps Mercy Hospital	786	80	10.18	9.75	11.01	8.67-13.68	
	Sharp Chula Vista Medical Center	356	30	8.43	9.57	9.29	6.12-13.29	
	Sharp Coronado Hospital and Healthcare Center	39	4	10.26	12.94	8.36	1.91-19.97	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
San Diego (continued)	Sharp Memorial Hospital	556	54	9.71	9.81	10.45	7.78-13.57	
	Tri-City Medical Center – Oceanside	571	92	16.11	11.84	14.36	11.60-17.42	Worse
	UC San Diego Medical Center	363	28	7.71	8.30	9.81	6.40-14.13	
San Francisco	California Pacific Medical Center – Davies Campus	131	15	11.45	12.93	9.34	5.18-14.91	
	California Pacific Medical Center – Pacific Campus	375	33	8.80	12.08	7.68	5.19-10.77	
	California Pacific Medical Center – St. Luke's Campus	40	5	12.50	9.51	13.87	4.06-30.21	
	Chinese Hospital	98	5	5.10	8.73	6.16	1.70-14.44	
	Kaiser Foundation Hospital – San Francisco	311	26	8.36	9.85	8.96	5.77-13.04	
	Saint Francis Memorial Hospital	179	21	11.73	12.36	10.01	6.16-14.91	
	Saint Mary's Medical Center – San Francisco	144	14	9.72	12.48	8.22	4.19-13.88	
	San Francisco General Hospital	359	28	7.80	5.98	13.77	8.88-20.00	
	UC San Francisco Medical Center	358	37	10.34	9.80	11.12	7.71-15.26	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
San Joaquin	Dameron Hospital	167	15	8.98	5.92	16.02	8.49-26.52	
	Doctors Hospital of Manteca	89	10	11.24	10.60	11.18	5.13-19.93	
	Kaiser Foundation Hospital – Manteca	128	17	13.28	10.69	13.11	7.68-20.13	
	Lodi Memorial Hospital	165	21	12.73	12.12	11.07	6.61-16.83	
	Saint Joseph's Medical Center of Stockton	435	51	11.72	10.50	11.78	8.73-15.34	
	San Joaquin General Hospital	137	13	9.49	4.37	22.90	11.56-38.94	Worse
	Sutter Tracy Community Hospital	103	14	13.59	11.86	12.09	6.59-19.34	
San Luis Obispo	Arroyo Grande Community Hospital	102	9	8.82	9.66	9.64	4.26-18.14	
	French Hospital Medical Center	105	14	13.33	12.05	11.68	6.19-19.12	
	Sierra Vista Regional Medical Center	153	18	11.77	11.35	10.94	6.30-17.16	
	Twin Cities Community Hospital	160	26	16.25	11.85	14.46	9.28-20.85	
San Mateo	Kaiser Foundation Hospital – Redwood City	280	32	11.43	13.55	8.90	6.09-12.35	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
San Mateo (continued)	Kaiser Foundation Hospital – South San Francisco	217	19	8.76	9.72	9.50	5.55-14.77	
	Peninsula Medical Center	371	50	13.48	14.25	9.98	7.38-12.99	
	San Mateo Medical Center	47	3	6.38	5.30	12.71	2.18-35.89	
	Sequoia Hospital	132	23	17.42	13.99	13.14	8.36-19.02	
	Seton Medical Center	311	45	14.47	11.96	12.76	9.29-16.83	
Santa Barbara	Lompoc Valley Medical Center	80	12	15.00	11.51	13.75	7.32-22.69	
	Marian Region Medical Center	250	36	14.40	11.20	13.56	9.41-18.54	
	Santa Barbara Cottage Hospital	514	64	12.45	11.26	11.66	8.93-14.80	
Santa Clara	El Camino Hospital	394	37	9.39	12.90	7.68	5.30-10.58	
	Good Samaritan Hospital – San Jose	463	55	11.88	12.23	10.24	7.70-13.22	
	Kaiser Foundation Hospital – San Jose	345	27	7.83	9.18	8.99	5.79-13.08	
	Kaiser Foundation Hospital – Santa Clara	415	36	8.68	10.34	8.85	6.13-12.20	
	O'Connor Hospital – San Jose	226	30	13.27	11.86	11.81	7.97-16.51	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Santa Clara (continued)	Regional Medical of San Jose	396	38	9.60	10.37	9.77	6.78-13.37	
	Saint Louise Regional Hospital	102	16	15.69	14.51	11.40	6.50-17.64	
	Santa Clara Valley Medical Center	371	19	5.12	4.38	12.33	7.11-19.50	
	Stanford Hospital	387	46	11.89	11.78	10.65	7.77-14.04	
Santa Cruz	Dominican Hospital – Santa Cruz/Soquel	301	32	10.63	12.41	9.04	6.12-12.64	
	Watsonville Community Hospital	103	10	9.71	10.41	9.83	4.40-17.76	
Shasta	Mercy Medical Center – Redding	415	72	17.35	12.80	14.30	11.27-17.71	Worse
	Shasta Regional Medical Center	263	27	10.27	8.57	12.63	8.05-18.46	
Siskiyou	Fairchild Medical Center	39	6	15.39	9.21	17.63	6.16-36.08	
Solano	Kaiser Foundation Hospital – Rehabilitation Center Vallejo	310	29	9.36	12.44	7.93	5.28-11.21	
	Kaiser Foundation Hospital – Vacaville	191	12	6.28	9.19	7.21	3.61-12.49	
	North Bay Medical Center	147	12	8.16	8.67	9.93	4.99-16.87	
	North Bay VacaValley Hospital	30	2	6.67	10.10	6.96	0.55-23.70	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Solano (continued)	Sutter Solano Medical Center	133	13	9.77	11.02	9.36	5.09-15.10	
Sonoma	Healdsburg District Hospital	54	12	22.22	13.77	17.02	8.82-27.75	
	Kaiser Foundation Hospital – Santa Rosa	283	41	14.49	13.64	11.20	8.03-14.95	
	Palm Drive Hospital	44	3	6.82	13.50	5.33	0.81-15.36	
	Petaluma Valley Hospital	83	12	14.46	13.67	11.16	5.74-18.57	
	Santa Rosa Memorial Hospital – Montgomery	279	43	15.41	11.12	14.63	10.42-19.57	
	Sonoma Valley Hospital	56	8	14.29	19.64	7.67	3.12-14.34	
	Sutter Medical Center of Santa Rosa	77	8	10.39	9.74	11.25	4.59-21.25	
Stanislaus	Doctors Medical Center	459	45	9.80	9.43	10.97	7.90-14.63	
	Emanuel Medical Center, Inc.	162	19	11.73	8.44	14.66	8.52-22.64	
	Memorial Hospital Medical Center – Modesto	417	49	11.75	10.85	11.43	8.36-15.05	
	Oak Valley District Hospital	40	3	7.50	9.04	8.76	1.33-25.04	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Tehama	Saint Elizabeth Community Hospital	84	10	11.91	11.63	10.79	5.07-19.17	
Tulare	Kaweah Delta Medical Center	493	62	12.58	9.35	14.18	10.86-18.01	Worse
	Sierra View District Hospital	237	35	14.77	10.71	14.55	10.15-19.79	
	Tulare Regional Medical Center	104	12	11.54	8.35	14.57	7.18-24.85	
Tuolumne	Sonora Regional Medical Center – Greenley	146	18	12.33	14.30	9.09	5.27-14.00	
Ventura	Community Memorial Hospital – San Buenaventura	333	34	10.21	11.02	9.78	6.69-13.59	
	Los Robles Hospital and Medical Center	297	37	12.46	13.12	10.02	6.99-13.68	
	Saint John's Pleasant Valley Hospital	151	25	16.56	13.27	13.17	8.40-19.02	
	Saint John's Regional Medical Center	305	34	11.15	9.53	12.33	8.42-17.13	
	Simi Valley Hospital and Healthcare Services – Sycamore	123	15	12.20	11.27	11.41	6.56-17.84	
	Ventura County Medical Center	140	10	7.14	8.80	8.56	4.03-15.22	
Yolo	Sutter Davis Hospital	87	12	13.79	12.04	12.08	6.23-20.33	

Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2011-2012

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		**70,213**	**7,406**	**10.55**				
Yolo (continued)	Woodland Memorial Hospital	118	24	20.34	11.95	17.96	11.59-25.63	Worse
Yuba	Rideout Memorial Hospital	331	36	10.88	10.43	11.00	7.71-14.97	

* A Hospital is classified as "Better" if the upper 98% Confidence Interval (CI) of the risk-adjusted rate falls below the California observed rate (10.55% for RAMR, 12.80% 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.

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Alameda	Alameda County Medical Center – Highland Campus	199	20	10.05	11.65	11.05	6.27-17.61	
	Alameda Hospital	92	18	19.57	13.42	18.67	10.49-29.31	
	Alta Bates Summit Medical Center – Alta Bates Campus	281	34	12.10	13.00	11.91	7.87-17.00	
	Alta Bates Summit Medical Center – Summit Campus – Hawthorne	441	54	12.25	15.42	10.17	7.38-13.51	
	Eden Medical Center	376	51	13.56	12.96	13.40	9.64-17.91	
	Kaiser Foundation Hospital – Hayward	369	49	13.28	13.86	12.27	8.76-16.49	
	Kaiser Foundation Hospital – Oakland Campus	542	75	13.84	14.61	12.12	9.30-15.40	
	Saint Rose Hospital	102	18	17.65	12.92	17.48	9.78-27.68	
	San Leandro Hospital	71	8	11.27	16.16	8.93	3.36-17.99	
	Valleycare Medical Center	115	19	16.52	11.69	18.09	10.28-28.40	
	Washington Hospital – Fremont	342	51	14.91	13.46	14.18	10.24-18.88	
Amador	Sutter Amador Hospital	100	5	5.00	11.78	5.43	1.41-13.59	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Butte	Enloe Medical Center – Esplanade Campus	411	36	8.76	11.35	9.88	6.56-14.10	
	Feather River Hospital	137	12	8.76	11.53	9.72	4.51-17.68	
	Oroville Hospital	174	24	13.79	11.54	15.30	9.26-23.17	
Calaveras	Mark Twain Saint Joseph's Hospital	51	7	13.73	11.48	15.31	5.33-31.73	
Contra Costa	Contra Costa Regional Medical Center	105	12	11.43	11.81	12.39	5.80-22.19	
	Doctors Medical Center – San Pablo	238	34	14.29	14.15	12.93	8.58-18.33	
	John Muir Medical Center – Concord Campus	282	42	14.89	14.05	13.57	9.45-18.58	
	John Muir Medical Center – Walnut Creek Campus	368	37	10.05	12.06	10.67	7.15-15.11	
	Kaiser Foundation Hospital – Antioch	197	19	9.65	14.04	8.79	4.91-14.18	
	Kaiser Foundation Hospital – Walnut Creek	324	39	12.04	14.00	11.01	7.50-15.36	
	San Ramon Regional Medical Center	114	13	11.40	12.06	12.11	5.87-21.24	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Contra Costa (continued)	Sutter Delta Medical Center	172	27	15.70	14.42	13.93	8.76-20.50	
Del Norte	Sutter Coast Hospital	83	8	9.64	11.61	10.63	3.97-21.71	
El Dorado	Barton Memorial Hospital	36	2	5.56	11.68	6.09	0.46-23.22	
	Marshall Medical Center	160	15	9.38	12.82	9.36	4.79-15.97	
Fresno	Clovis Community Medical Center	166	20	12.05	12.23	12.61	7.19-19.96	
	Community Regional Medical Center – Fresno	639	94	14.71	13.21	14.26	11.28-17.65	
	Kaiser Foundation Hospital – Fresno	300	36	12.00	13.87	11.08	7.41-15.66	
	Saint Agnes Medical Center	749	104	13.89	12.94	13.74	10.99-16.85	
Humboldt	Mad River Community Hospital	51	9	17.65	10.09	22.39	9.18-42.13	
	Redwood Memorial Hospital	37	4	10.81	11.97	11.57	2.46-30.04	
	Saint Joseph Hospital – Eureka	173	15	8.67	12.97	8.56	4.36-14.68	
Imperial	El Centro Regional Medical Center	191	29	15.18	13.47	14.43	9.23-21.00	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Imperial (continued)	Pioneers Memorial Hospital	147	17	11.57	11.89	12.45	6.71-20.47	
Kern	Bakersfield Heart Hospital	97	10	10.31	12.23	10.79	4.59-20.50	
	Bakersfield Memorial Hospital	282	36	12.77	13.29	12.29	8.25-17.33	
	Delano Regional Medical Center	30	6	20.00	12.99	19.71	6.24-41.09	
	Kern Medical Center	51	3	5.88	11.14	6.76	1.00-20.99	
	Mercy Hospital – Bakersfield	166	25	15.06	12.03	16.03	9.85-23.99	
	Ridgecrest Regional Hospital	32	2	6.25	11.13	7.19	0.54-27.11	
	San Joaquin Community Hospital	643	81	12.60	12.11	13.32	10.29-16.82	
Kings	Adventist Medical Center	198	28	14.14	13.65	13.27	8.40-19.46	
Lake	Sutter Lakeside Hospital	56	2	3.57	13.99	3.27	0.25-12.78	Better
Los Angeles	Alhambra Hospital	96	12	12.50	15.38	10.40	4.89-18.49	
	Antelope Valley Hospital	414	61	14.73	12.91	14.61	10.87-19.01	
	Beverly Hospital	146	20	13.70	13.92	12.60	7.23-19.77	
	Brotman Medical Center	136	30	22.06	14.99	18.84	12.37-26.66	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Los Angeles (continued)	California Hospital Medical Center – Los Angeles	182	27	14.84	13.51	14.06	8.84-20.72	
	Cedars Sinai Medical Center	741	124	16.73	13.56	15.80	12.94-18.98	Worse
	Centinela Hospital Medical Center	488	102	20.90	16.13	16.59	13.36-20.18	Worse
	Citrus Valley Medical Center – Inter-Community Campus	174	26	14.94	12.67	15.10	9.37-22.44	
	Citrus Valley Medical Center – Queen of the Valley Campus	223	27	12.11	12.58	12.32	7.68-18.34	
	Community and Mission Hospital of Huntington Park – Slauson	49	4	8.16	12.40	8.43	1.78-22.39	
	Community Hospital of Long Beach	58	8	13.79	12.36	14.29	5.42-28.39	
	Downey Regional Medical Center	244	39	15.98	13.54	15.11	10.37-20.87	
	East Los Angeles Doctors Hospital	38	4	10.53	15.30	8.81	1.89-22.72	
	Encino Hospital Medical Center	38	8	21.05	16.61	16.22	6.31-30.73	
	Foothill Presbyterian Hospital – Johnston Memorial	123	20	16.26	12.10	17.20	9.92-26.76	
	Garfield Medical Center	304	54	17.76	14.54	15.64	11.46-20.54	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Los Angeles (continued)	Glendale Adventist Medical Center – Wilson Terrace	330	51	15.46	13.96	14.17	10.24-18.84	
	Glendale Memorial Hospital and Medical Center	201	36	17.91	12.62	18.17	12.29-25.32	
	Good Samaritan Hospital – Los Angeles	191	30	15.71	13.69	14.69	9.48-21.23	
	Greater El Monte Community Hospital	42	12	28.57	15.07	24.27	11.97-39.95	
	Henry Mayo Newhall Memorial Hospital	220	35	15.91	12.79	15.93	10.68-22.40	
	Hollywood Presbyterian Medical Center	247	54	21.86	13.94	20.08	14.83-26.14	Worse
	Huntington Memorial Hospital	503	58	11.53	12.92	11.42	8.38-15.06	
	Kaiser Foundation Hospital – Baldwin Park	316	46	14.56	13.06	14.27	10.09-19.31	
	Kaiser Foundation Hospital – Downey	353	52	14.73	13.63	13.83	10.01-18.39	
	Kaiser Foundation Hospital – Panorama City	260	35	13.46	12.77	13.50	8.99-19.12	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Los Angeles (continued)	Kaiser Foundation Hospital – South Bay	256	46	17.97	14.40	15.98	11.38-21.43	
	Kaiser Foundation Hospital – Sunset	418	45	10.77	12.82	10.75	7.52-14.71	
	Kaiser Foundation Hospital – West Los Angeles	309	52	16.83	14.18	15.19	11.04-20.09	
	Kaiser Foundation Hospital – Woodland Hills	272	30	11.03	13.60	10.38	6.64-15.21	
	Keck Hospital of University of Southern California	60	5	8.33	11.79	9.05	2.38-22.02	
	Lakewood Regional Medical Center	307	49	15.96	13.54	15.09	10.84-20.16	
	Long Beach Memorial Medical Center	611	103	16.86	12.34	17.48	14.02-21.38	Worse
	Los Angeles Community Hospital	57	14	24.56	17.11	18.38	9.53-29.83	
	Los Angeles County/Harbor – UCLA Medical Center	286	35	12.24	11.51	13.62	9.05-19.35	
	Los Angeles County/Olive View – UCLA Medical Center	168	15	8.93	11.08	10.32	5.26-17.69	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Los Angeles (continued)	Los Angeles County/University of Southern California Medical Center	192	31	16.15	11.45	18.05	11.73-25.96	
	Marina Del Rey Hospital	93	14	15.05	13.69	14.08	7.10-23.87	
	Memorial Hospital of Gardena	103	14	13.59	15.19	11.45	5.78-19.49	
	Methodist Hospital of Southern California	560	88	15.71	13.17	15.28	12.00-19.01	
	Mission Community Hospital – Panorama Campus	43	8	18.61	16.52	14.42	5.57-27.73	
	Monterey Park Hospital	56	7	12.50	13.36	11.98	4.16-25.01	
	Northridge Hospital Medical Center	337	38	11.28	12.47	11.58	7.83-16.26	
	Olympia Medical Center	99	19	19.19	15.14	16.23	9.28-25.23	
	Pacific Alliance Medical Center, Inc.	88	13	14.77	15.32	12.35	6.06-21.27	
	Pacific Hospital of Long Beach	44	9	20.46	16.66	15.71	6.57-28.84	
	Pacifica Hospital of the Valley	31	8	25.81	13.22	24.98	9.86-46.02	
	Palmdale Regional Medical Center	172	19	11.05	12.08	11.71	6.55-18.80	
	Pomona Valley Hospital Medical Center	556	73	13.13	12.58	13.36	10.20-17.05	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Los Angeles (continued)	Presbyterian Intercommunity Hospital	517	72	13.93	13.64	13.07	9.96-16.69	
	Providence Holy Cross Medical Center	352	46	13.07	13.74	12.17	8.59-16.52	
	Providence Little Company of Mary Medical Center – San Pedro	179	31	17.32	12.32	18.00	11.75-25.74	
	Providence Little Company of Mary Medical Center – Torrance	519	68	13.10	12.53	13.39	10.10-17.25	
	Providence Saint Joseph Medical Center	556	79	14.21	12.45	14.61	11.28-18.45	
	Providence Tarzana Medical Center	296	35	11.82	12.75	11.88	7.89-16.89	
	Ronald Reagan UCLA Medical Center	451	61	13.53	12.61	13.73	10.19-17.91	
	Saint Francis Medical Center	211	39	18.48	15.16	15.61	10.79-21.40	
	Saint John's Health Center	160	20	12.50	12.85	12.45	7.12-19.65	
	Saint Mary Medical Center	189	26	13.76	15.24	11.55	7.17-17.20	
	Saint Vincent Medical Center	171	25	14.62	13.53	13.84	8.50-20.71	
	San Dimas Community Hospital	74	12	16.22	13.30	15.61	7.46-27.17	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Los Angeles (continued)	San Gabriel Valley Medical Center	155	24	15.48	13.52	14.67	8.91-22.09	
	Santa Monica – UCLA Medical Center and Orthopedic Hospital	193	32	16.58	12.03	17.64	11.59-25.13	
	Sherman Oaks Hospital	64	9	14.06	14.60	12.33	5.02-23.57	
	Temple Community Hospital	51	12	23.53	15.68	19.21	9.29-32.47	
	Torrance Memorial Medical Center	571	68	11.91	12.61	12.09	9.10-15.61	
	Valley Presbyterian Hospital	193	32	16.58	14.11	15.04	9.90-21.40	
	Verdugo Hills Hospital	115	20	17.39	11.34	19.63	11.37-30.42	
	West Hills Hospital and Medical Center	188	25	13.30	11.28	15.09	9.23-22.72	
	White Memorial Medical Center	416	77	18.51	15.72	15.07	11.68-18.93	
	Whittier Hospital Medical Center	107	14	13.08	14.08	11.90	6.00-20.26	
Madera	Madera Community Hospital	61	8	13.12	12.77	13.15	4.97-26.27	
Marin	Kaiser Foundation Hospital – San Rafael	198	15	7.58	12.40	7.82	3.98-13.47	
	Marin General Hospital	245	31	12.65	12.64	12.82	8.29-18.57	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Marin (continued)	Novato Community Hospital	39	1	2.56	13.58	2.42	0.02-14.58	
Mendocino	Frank R. Howard Memorial Hospital	31	0	0.00	11.88	0.00	0.00-14.77	
	Mendocino Coast District Hospital	47	10	21.28	10.77	25.28	11.09-45.34	
	Ukiah Valley Medical Center	98	9	9.18	11.50	10.22	4.10-20.14	
Merced	Mercy Medical Center – Merced	251	31	12.35	13.95	11.34	7.34-16.41	
Monterey	Community Hospital Monterey Peninsula	294	38	12.93	11.78	14.04	9.52-19.65	
	Natividad Medical Center	52	4	7.69	11.22	8.77	1.85-23.47	
	Salinas Valley Memorial Hospital	288	36	12.50	12.94	12.37	8.29-17.45	
Napa	Queen of the Valley Hospital – Napa	172	28	16.28	13.54	15.40	9.80-22.44	
	Saint Helena Hospital	81	10	12.35	13.08	12.08	5.19-22.60	
Nevada	Sierra Nevada Memorial Hospital	187	21	11.23	11.27	12.75	7.36-20.06	
Orange	AHMC Anaheim Regional Medical Center	248	49	19.76	12.52	20.20	14.60-26.76	Worse
	Fountain Valley Regional Hospital and Medical Center – Euclid	440	60	13.64	13.65	12.79	9.48-16.70	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Orange (continued)	Garden Grove Hospital and Medical Center	87	12	13.79	13.02	13.56	6.38-24.03	
	Hoag Memorial Hospital Presbyterian	777	92	11.84	11.66	13.01	10.22-16.21	
	Huntington Beach Hospital	62	10	16.13	14.41	14.33	6.22-26.27	
	Kaiser Foundation Hospital – Anaheim	361	32	8.86	13.03	8.71	5.64-12.67	Better
	La Palma Intercommunity Hospital	80	8	10.00	12.43	10.30	3.86-20.97	
	Los Alamitos Medical Center	438	42	9.59	11.95	10.27	7.07-14.26	
	Mission Hospital Regional Medical Center	471	59	12.53	11.72	13.68	10.08-17.96	
	Orange Coast Memorial Medical Center	201	28	13.93	12.15	14.67	9.28-21.55	
	Placentia Linda Hospital	76	10	13.16	11.35	14.84	6.37-27.74	
	Saddleback Memorial Medical Center	425	63	14.82	12.49	15.19	11.36-19.68	
	Saint Joseph Hospital – Orange	440	51	11.59	12.30	12.07	8.66-16.19	
	Saint Jude Medical Center	500	70	14.00	12.70	14.11	10.71-18.07	

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County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Orange (continued)	UC Irvine Medical Center	319	39	12.23	12.38	12.64	8.61-17.63	
	West Anaheim Medical Center	145	19	13.10	14.10	11.89	6.70-18.92	
	Western Medical Center – Santa Ana	158	15	9.49	12.84	9.46	4.84-16.14	
Placer	Kaiser Foundation Hospital – Roseville	448	51	11.38	13.10	11.12	7.97-14.93	
	Sutter Auburn Faith Hospital	175	14	8.00	12.95	7.91	3.92-13.83	
	Sutter Roseville Medical Center	438	59	13.47	13.10	13.16	9.73-17.23	
Riverside	Corona Regional Medical Center – Main	146	21	14.38	12.96	14.21	8.29-22.05	
	Desert Regional Medical Center	432	49	11.34	11.72	12.39	8.81-16.73	
	Eisenhower Medical Center	796	78	9.80	11.59	10.82	8.29-13.79	
	Hemet Valley Medical Center	385	58	15.07	13.40	14.40	10.63-18.83	
	John F. Kennedy Memorial Hospital	115	15	13.04	12.94	12.90	6.66-21.67	
	Kaiser Foundation Hospital – Moreno Valley	91	14	15.39	14.54	13.55	6.84-22.92	

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County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Riverside (continued)	Kaiser Foundation Hospital – Riverside	217	14	6.45	13.16	6.28	3.10-11.04	Better
	Menifee Valley Medical Center	117	24	20.51	13.24	19.84	12.24-29.34	
	Parkview Community Hospital Medical Center	146	27	18.49	12.86	18.42	11.63-26.91	
	Riverside Community Hospital	438	70	15.98	13.26	15.43	11.75-19.70	
	Riverside County Regional Medical Center	270	35	12.96	12.01	13.82	9.19-19.61	
	San Gorgonio Memorial Hospital	106	12	11.32	13.01	11.14	5.21-19.97	
	Southwest Healthcare System – Murrieta	407	62	15.23	12.08	16.14	12.04-20.94	
Sacramento	Kaiser Foundation Hospital – Sacramento	415	39	9.40	13.57	8.87	6.01-12.45	Better
	Kaiser Foundation Hospital – South Sacramento	425	39	9.18	14.56	8.07	5.47-11.33	Better
	Mercy General Hospital	310	27	8.71	12.66	8.81	5.45-13.25	
	Mercy Hospital – Folsom	116	13	11.21	11.14	12.88	6.23-22.65	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Sacramento (continued)	Mercy San Juan Hospital	597	74	12.40	12.68	12.51	9.55-15.97	
	Methodist Hospital of Sacramento	312	49	15.71	13.89	14.47	10.39-19.33	
	Sutter General Hospital	363	45	12.40	13.01	12.19	8.56-16.63	
	Sutter Memorial Hospital	163	18	11.04	12.90	10.96	6.01-17.81	
	UC Davis Medical Center	372	45	12.10	11.92	12.99	9.10-17.75	
San Benito	Hazel Hawkins Memorial Hospital	45	5	11.11	11.08	12.84	3.40-30.59	
San Bernardino	Arrowhead Regional Medical Center	418	57	13.64	11.32	15.43	11.31-20.33	
	Barstow Community Hospital	61	13	21.31	11.85	23.03	11.44-38.71	
	Chino Valley Medical Center	104	13	12.50	14.16	11.30	5.50-19.72	
	Community Hospital of San Bernardino	65	8	12.31	13.01	12.11	4.59-24.22	
	Desert Valley Hospital	219	42	19.18	14.95	16.42	11.53-22.23	
	Hi-Desert Medical Center	106	18	16.98	11.58	18.77	10.50-29.73	
	Kaiser Foundation Hospital – Fontana	457	68	14.88	13.48	14.13	10.70-18.13	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
San Bernardino (continued)	Loma Linda University Medical Center	502	62	12.35	12.55	12.60	9.35-16.44	
	Montclair Hospital Medical Center	36	9	25.00	12.24	26.14	11.03-46.99	
	Redlands Community Hospital	259	26	10.04	12.34	10.41	6.40-15.71	
	Saint Bernadine Medical Center	280	28	10.00	12.89	9.93	6.23-14.77	
	Saint Mary Regional Medical Center	408	51	12.50	12.39	12.92	9.28-17.30	
	San Antonio Community Hospital	438	47	10.73	11.40	12.06	8.50-16.41	
	Victor Valley Community Hospital	85	9	10.59	12.22	11.09	4.46-21.69	
San Diego	Alvarado Hospital	177	18	10.17	13.22	9.85	5.40-16.04	
	Grossmont Hospital	798	138	17.29	12.64	17.52	14.50-20.85	Worse
	Kaiser Foundation Hospital – San Diego	507	67	13.22	12.19	13.88	10.45-17.90	
	Palomar Medical Center	532	67	12.59	11.60	13.90	10.45-17.96	
	Paradise Valley Hospital	143	27	18.88	15.87	15.23	9.68-22.10	
	Pomerado Hospital	218	21	9.63	11.37	10.85	6.25-17.14	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
San Diego (continued)	Scripps Green Hospital	196	26	13.27	11.86	14.32	8.86-21.38	
	Scripps Memorial Hospital – Encinitas	291	22	7.56	11.34	8.53	4.96-13.45	
	Scripps Memorial Hospital – La Jolla	348	37	10.63	12.35	11.02	7.39-15.58	
	Scripps Mercy Hospital	734	113	15.40	13.00	15.16	12.26-18.42	
	Sharp Chula Vista Medical Center	339	45	13.27	13.34	12.74	8.95-17.34	
	Sharp Coronado Hospital and Healthcare Center	38	4	10.53	11.89	11.33	2.42-29.43	
	Sharp Memorial Hospital	526	68	12.93	11.96	13.84	10.43-17.84	
	Tri-City Medical Center – Oceanside	528	47	8.90	11.32	10.06	7.07-13.76	
	UC San Diego Medical Center	341	55	16.13	12.30	16.78	12.30-22.06	
San Francisco	California Pacific Medical Center – Davies Campus	118	12	10.17	12.93	10.07	4.69-18.16	
	California Pacific Medical Center – Pacific Campus	352	48	13.64	12.87	13.56	9.66-18.26	
	California Pacific Medical Center – St. Luke's Campus	38	4	10.53	15.69	8.59	1.83-22.28	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
San Francisco (continued)	Chinese Hospital	95	10	10.53	12.68	10.62	4.53-20.13	
	Kaiser Foundation Hospital – San Francisco	296	22	7.43	13.41	7.10	4.13-11.17	Better
	Saint Francis Memorial Hospital	163	24	14.72	13.93	13.53	8.21-20.42	
	Saint Mary's Medical Center – San Francisco	139	15	10.79	12.44	11.11	5.70-18.87	
	San Francisco General Hospital	332	40	12.05	11.85	13.01	8.90-18.11	
	UC San Francisco Medical Center	332	38	11.45	12.52	11.70	7.92-16.42	
San Joaquin	Dameron Hospital	162	19	11.73	13.17	11.40	6.39-18.25	
	Doctors Hospital of Manteca	85	12	14.12	12.82	14.09	6.63-24.94	
	Kaiser Foundation Hospital – Manteca	123	9	7.32	14.25	6.58	2.63-13.06	
	Lodi Memorial Hospital	160	16	10.00	11.71	10.93	5.73-18.35	
	Saint Joseph's Medical Center of Stockton	404	56	13.86	12.73	13.94	10.21-18.38	
	San Joaquin General Hospital	131	15	11.45	11.76	12.47	6.40-21.13	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
San Joaquin (continued)	Sutter Tracy Community Hospital	97	16	16.50	14.28	14.78	7.91-24.09	
San Luis Obispo	Arroyo Grande Community Hospital	98	8	8.16	11.13	9.39	3.49-19.37	
	French Hospital Medical Center	101	5	4.95	11.69	5.42	1.41-13.60	
	Sierra Vista Regional Medical Center	147	16	10.88	10.32	13.51	7.10-22.61	
	Twin Cities Community Hospital	150	12	8.00	10.75	9.53	4.40-17.41	
San Mateo	Kaiser Foundation Hospital – Redwood City	254	23	9.06	13.05	8.88	5.26-13.77	
	Kaiser Foundation Hospital – South San Francisco	206	31	15.05	13.76	14.00	9.11-20.14	
	Peninsula Medical Center	347	38	10.95	12.67	11.06	7.48-15.54	
	San Mateo Medical Center	46	4	8.70	11.58	9.61	2.03-25.49	
	Sequoia Hospital	118	9	7.63	12.01	8.13	3.25-16.14	
	Seton Medical Center	290	30	10.35	14.17	9.34	5.97-13.70	
Santa Barbara	Lompoc Valley Medical Center	72	4	5.56	10.76	6.61	1.38-18.11	
	Marian Medical Center	234	21	8.97	12.93	8.89	5.11-14.06	

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County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Santa Barbara (continued)	Santa Barbara Cottage Hospital	482	36	7.47	10.89	8.78	5.82-12.58	Better
Santa Clara	El Camino Hospital	373	39	10.46	12.40	10.80	7.33-15.14	
	Good Samaritan Hospital – San Jose	430	36	8.37	11.61	9.23	6.13-13.19	
	Kaiser Foundation Hospital – San Jose	335	44	13.13	13.47	12.48	8.73-17.04	
	Kaiser Foundation Hospital – Santa Clara	396	62	15.66	12.87	15.57	11.63-20.19	
	O'Connor Hospital – San Jose	215	29	13.49	12.17	14.19	9.03-20.78	
	Regional Medical of San Jose	377	58	15.39	14.11	13.96	10.31-18.26	
	Saint Louise Regional Hospital	96	6	6.25	13.84	5.78	1.76-13.31	
	Santa Clara Valley Medical Center	358	42	11.73	11.12	13.50	9.32-18.68	
	Stanford Hospital	366	35	9.56	11.38	10.76	7.11-15.40	
Santa Cruz	Dominican Hospital – Santa Cruz/Soquel	284	18	6.34	11.52	7.04	3.82-11.66	Better
	Watsonville Community Hospital	97	12	12.37	12.57	12.60	5.90-22.51	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Shasta	Mercy Medical Center – Redding	376	38	10.11	11.74	11.03	7.43-15.55	
	Shasta Regional Medical Center	248	32	12.90	11.13	14.84	9.66-21.40	
Siskiyou	Fairchild Medical Center	37	1	2.70	10.90	3.17	0.03-19.26	
Solano	Kaiser Foundation Hospital – Rehabilitation Center Vallejo	302	25	8.28	14.70	7.21	4.37-11.00	Better
	Kaiser Foundation Hospital – Vacaville	187	17	9.09	12.72	9.15	4.90-15.17	
	North Bay Medical Center	140	16	11.43	12.81	11.43	6.03-19.01	
	Sutter Solano Medical Center	129	12	9.30	14.17	8.41	3.92-15.18	
Sonoma	Healdsburg District Hospital	51	5	9.80	11.31	11.10	2.94-26.62	
	Kaiser Foundation Hospital – Santa Rosa	270	14	5.19	12.82	5.18	2.54-9.17	Better
	Palm Drive Hospital	43	5	11.63	12.48	11.93	3.17-28.16	
	Petaluma Valley Hospital	76	4	5.26	11.76	5.73	1.20-15.73	
	Santa Rosa Memorial Hospital – Montgomery	255	25	9.80	12.23	10.26	6.23-15.62	
	Sonoma Valley Hospital	54	1	1.85	12.29	1.93	0.02-12.06	Better

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Sonoma (continued)	Sutter Medical Center of Santa Rosa	73	9	12.33	11.38	13.87	5.61-26.86	
Stanislaus	Doctors Medical Center	437	33	7.55	12.56	7.69	5.00-11.17	Better
	Emanuel Medical Center, Inc.	157	15	9.55	11.17	10.95	5.59-18.72	
	Memorial Hospital Medical Center – Modesto	397	48	12.09	12.63	12.26	8.70-16.57	
	Oak Valley District Hospital	39	3	7.69	9.98	9.87	1.47-30.02	
Tehama	Saint Elizabeth Community Hospital	79	7	8.86	10.97	10.34	3.54-22.14	
Tulare	Kaweah Delta Medical Center	454	57	12.56	12.15	13.23	9.69-17.46	
	Sierra View District Hospital	220	27	12.27	12.59	12.48	7.78-18.58	
	Tulare Regional Medical Center	100	20	20.00	11.45	22.37	13.00-34.41	Worse
Tuolumne	Sonora Regional Medical Center – Greenley	136	12	8.82	12.86	8.78	4.08-15.93	
Ventura	Community Memorial Hospital – San Buenaventura	322	34	10.56	11.29	11.97	7.87-17.17	
	Los Robles Hospital and Medical Center	280	33	11.79	11.61	13.00	8.52-18.68	

Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2011-2012

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RARR)	98% CI for RARR	Performance Rating*
Statewide		**66,612**	**8,527**	**12.80**				
Ventura (continued)	Saint John's Pleasant Valley Hospital	146	16	10.96	11.85	11.84	6.22-19.79	
	Saint John's Regional Medical Center	286	37	12.94	13.37	12.39	8.35-17.41	
	Simi Valley Hospital and Healthcare Services – Sycamore	115	18	15.65	12.65	15.84	8.81-25.24	
	Ventura County Medical Center	131	15	11.45	12.79	11.46	5.90-19.39	
Yolo	Sutter Davis Hospital	82	6	7.32	13.11	7.14	2.18-16.29	
	Woodland Memorial Hospital	112	8	7.14	11.35	8.05	2.99-16.71	
Yuba	Rideout Memorial Hospital	315	37	11.75	12.90	11.66	7.85-16.41	

* A Hospital is classified as "Better" if the upper 98% Confidence Interval (CI) of the risk-adjusted rate falls below the California observed rate (12.80% 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.