

# *Nevada Stroke Registry: 2016 Data Summary*

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*May 2017 | Edition 0.3*



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Division of Public and Behavioral Health  
Department of Health and Human Services*

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## Recommended Citation

Office of Public Health Informatics and Epidemiology. Division of Public and Behavioral Health. *Nevada Stroke Registry: 2016 Data Summary*. Carson City, Nevada e0.3. May 2017.

# Background and Purpose

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The Nevada Division of Public and Behavioral Health (DPBH) and the American Heart Association/American Stroke Association (AHA/ASA) entered into collaboration on the nationally recognized Get With The Guidelines<sup>SM</sup> (GWTG) Registry program as the state's standardized data registry. The Nevada Stroke Registry collaboration provides Nevada acute care hospitals with necessary tools to view statewide, aggregated data and implement change in their health care systems to improve patient outcomes and quality of care.

Legislation passed in the 78<sup>th</sup> Session of the Nevada Legislature, [Senate Bill 196](#) (SB 196), requires DPBH to establish a stroke registry, provides for the inclusion of comprehensive and primary stroke centers on a list maintained by DPBH, and specifies required reporting of certain data by those centers. Support for SB 196 was provided by partners such as the AHA/ASA, the Nevada Hospital Association, and Nevada Rural Hospital Partnership.

GWTG ensures hospitals treat patients according to the most current nationally accepted recommendations and guidelines. Hospitals that implement GWTG can review real-time performance and identify interventions to benchmark and maximize patient care. However, the Nevada Stroke Registry aims to compile and analyze the data in an aggregate manner (rather than at an individual hospital level) to enhance the ways the current data can be used to improve stroke survivorship and parity of care statewide; thereby decreasing the disability burden. The DPBH Chief Biostatistician was given super-user access to GWTG to provide aggregate data for the 15 reporting comprehensive stroke centers. Currently, the DPBH Chief Biostatistician has permission from 10 hospitals to view individual data; however, in the aggregate, all 15 hospitals' data is reflected.

The Chronic Disease Prevention and Health Promotion (CDPHP) Section's Heart Disease and Stroke Prevention Program fostered the development of the Nevada Heart and Stroke Taskforce, which is actively engaged in promoting quality improvements in relation to stroke care in Nevada. The Nevada Stroke Registry aligns with the goals of the Nevada Heart and Stroke Taskforce as it promotes the use of clinical best practices in pre-hospital and hospital settings. In the Heart and Stroke Taskforce Strategic Plan, Goal 1 aligns with the quality-improvement aims of the Nevada Stroke Registry.

## **Goal 1: Improve access to effective care**

*Strategy 1.3* Promote clinical and public health systems that coordinate efforts to collect baseline data and share across the state.<sup>[1]</sup>

A draft version of this report was shared with the Heart and Stroke Taskforce in May 2017 to gain their input. Taskforce members were asked to provide feedback which has been incorporated throughout this document. The AHA/ASA provided valuable and detailed feedback in relation to draft versions of this report.

Finally, per statutory guidance in SB 196 [Sec. 6(1)d and Sec. 7(1)], outreach to encourage reporting and promote awareness of the stroke registry was targeted at all Nevada hospitals certified as acute stroke-ready hospitals, as well as to the Heart and Stroke Taskforce, Heart and Stroke Coordinators statewide, Emergency Medical Services (EMS) partners within and outside of the DPBH, and to the Nevada Rural Hospital Partnership. The Nevada Rural Hospital Partnership recently completed an assessment to identify opportunities to align current critical access hospital reporting with routes to reporting stroke information in a way that parallels the data collected in the Nevada Stroke Registry.

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<sup>[1]</sup> Note: Clinical systems include use of electronic health care records, information sharing, and use of health information exchange; and public health systems including state, local health departments, and other community health organizations (identify data sources, compile and clean data, creating reports).

# Nevada Stroke Burden

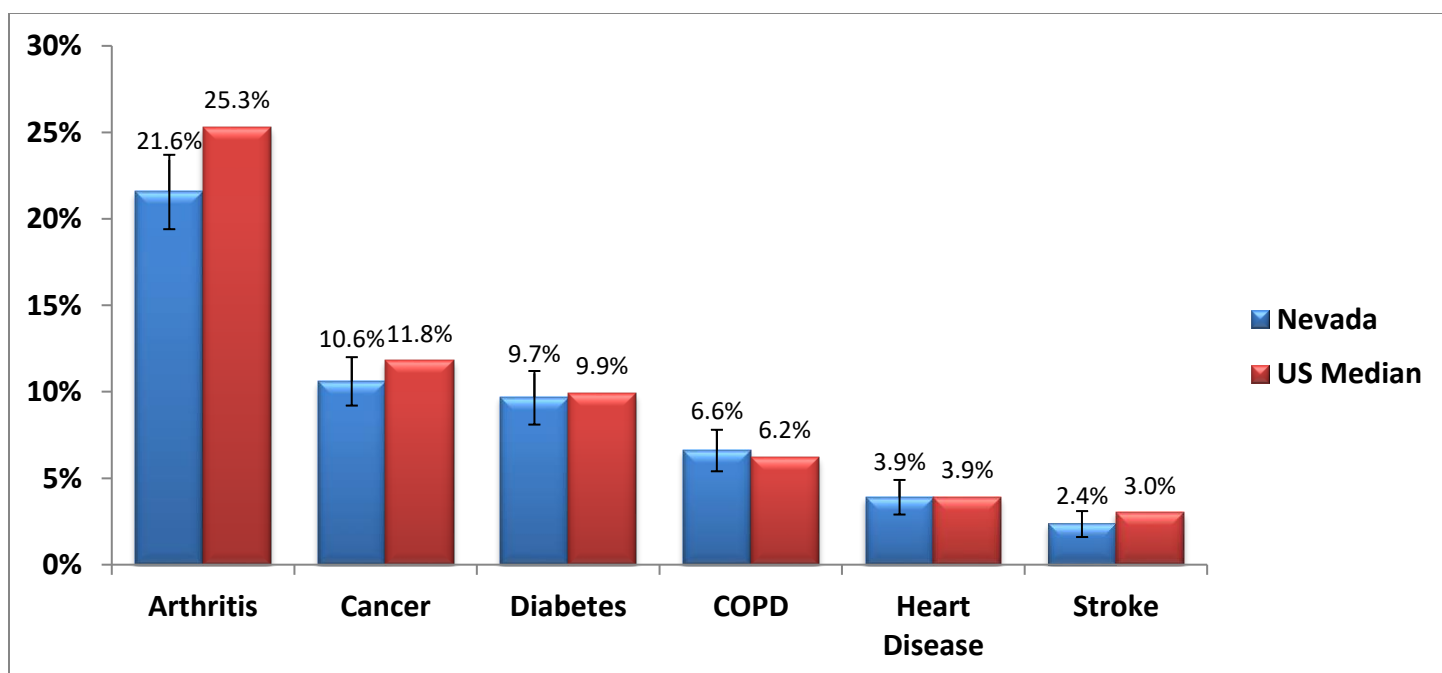
Heart disease and stroke are both leading causes of death in Nevada and the United States. Heart disease is the leading cause of death nationwide and in Nevada, while stroke is the fourth-leading cause nationwide and fifth in Nevada.<sup>1</sup>

Stroke kills more than 130,000 Americans each year and is responsible for one out of every 20 deaths.<sup>2</sup> It is estimated 2,209 people die from cardiovascular disease each day, and 795,000 experience a stroke each year. Of these stroke incidences, 610,000 are new or first time strokes, and 185,000, or nearly one in four, had a history of previous stroke.

Many factors increase the risk of stroke: tobacco use, physical inactivity, obesity/overweight, high blood pressure, and high cholesterol. Of these risk factors, smoking is also the leading cause of preventable death in the United States. One-third of American adults have high blood pressure, and of those, more than half do not have it under control. Although most adults with high blood pressure are treated with medication and see a doctor at least twice a year, their condition is not under control.<sup>3</sup>

Chronic disease prevalence in Nevada is addressed below using sampled self-reported data from the 2015 Behavioral Risk Factor Surveillance Survey (BRFSS). According to the most current data, Nevada's stroke prevalence is slightly lower than the U.S. median.

Figure 1. Prevalence of Chronic Diseases, Nevada vs. U.S., 2015 BRFSS Data



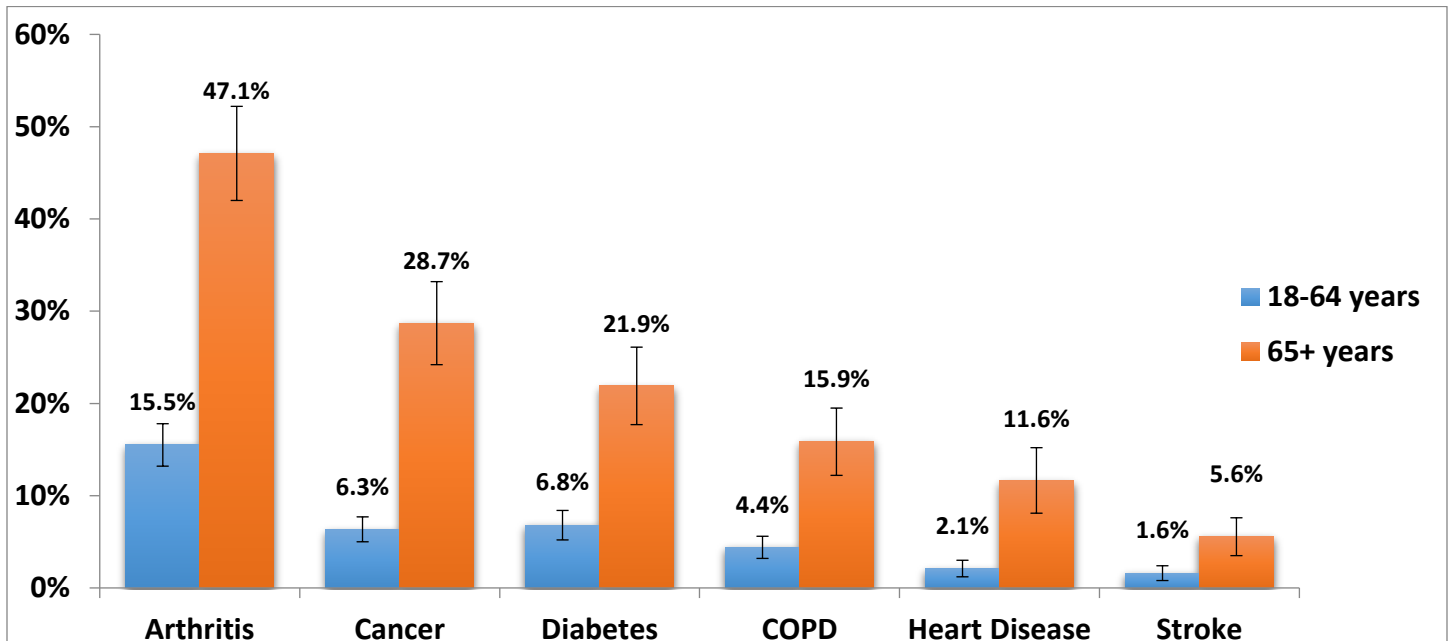
Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2015

<sup>1</sup> Centers for Disease Control and Prevention. (2013). Heart disease and stroke prevention: Addressing the nation's leading killers at a glance. Retrieved from: <http://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2011/heart-disease-and-stroke-aag-2011.pdf>

<sup>2</sup> Centers for Disease Control and Prevention (2014). [Underlying Cause of Death 1999–2014](#) on CDC WONDER Online Database, released 2015. Data are from the Multiple Cause of Death Files, 1999–2013, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed from <https://www.cdc.gov/stroke/facts.htm> May 8, 2017

<sup>3</sup> Nevada Division of Public and Behavioral Health, Chronic Disease Prevention and Health Promotion (2015). Heart Disease and Stroke Strategic Plan.

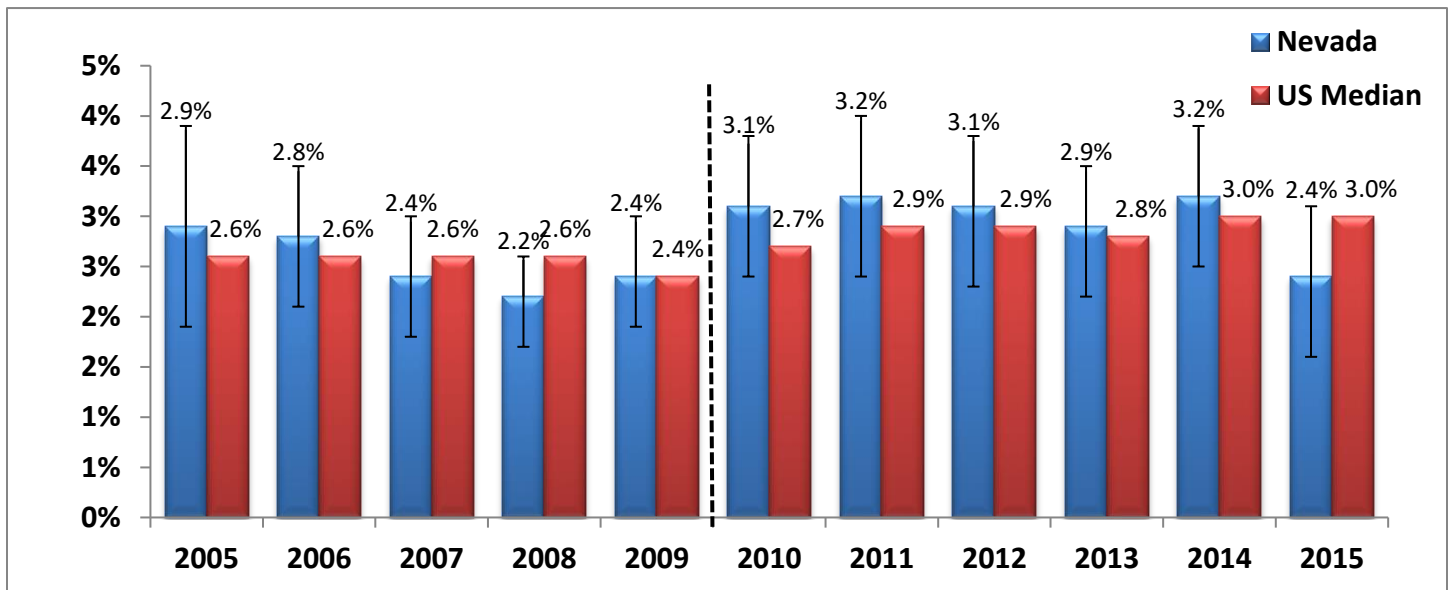
**Figure 2. Prevalence of Chronic Diseases by Age Groups, Nevada, 2015 BRFSS Data**



**Source:** Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2015.

The differential burden of stroke prevalence by age group can also be seen in the 2015 BRFSS data, with those over 65 years of age showing a higher prevalence of chronic disease when compared to those 18-64 years.

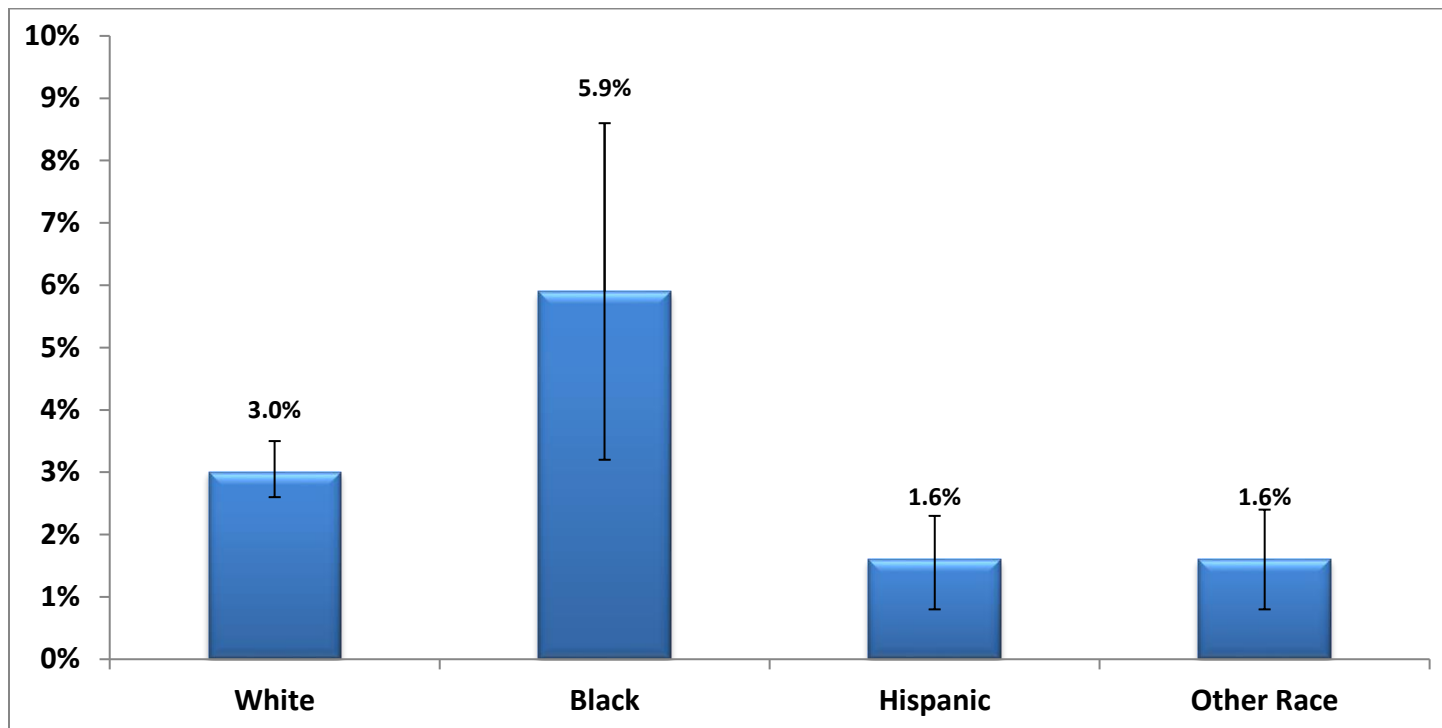
**Figure 3. Adults who have had a stroke, Nevada vs. U.S., 2005-2015 BRFSS Data**



Note: BRFSS methodology changed in 2011, therefore it may be misleading to compare statistics before and after the methodology change. Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005-2015.

Figure 3 shows the comparison of stroke prevalence in Nevada to that of the United States from 2005 to 2015. Stroke prevalence in Nevada exceeded the United States median for the 2010 to 2014 period, but fell below the United States Median in 2015.

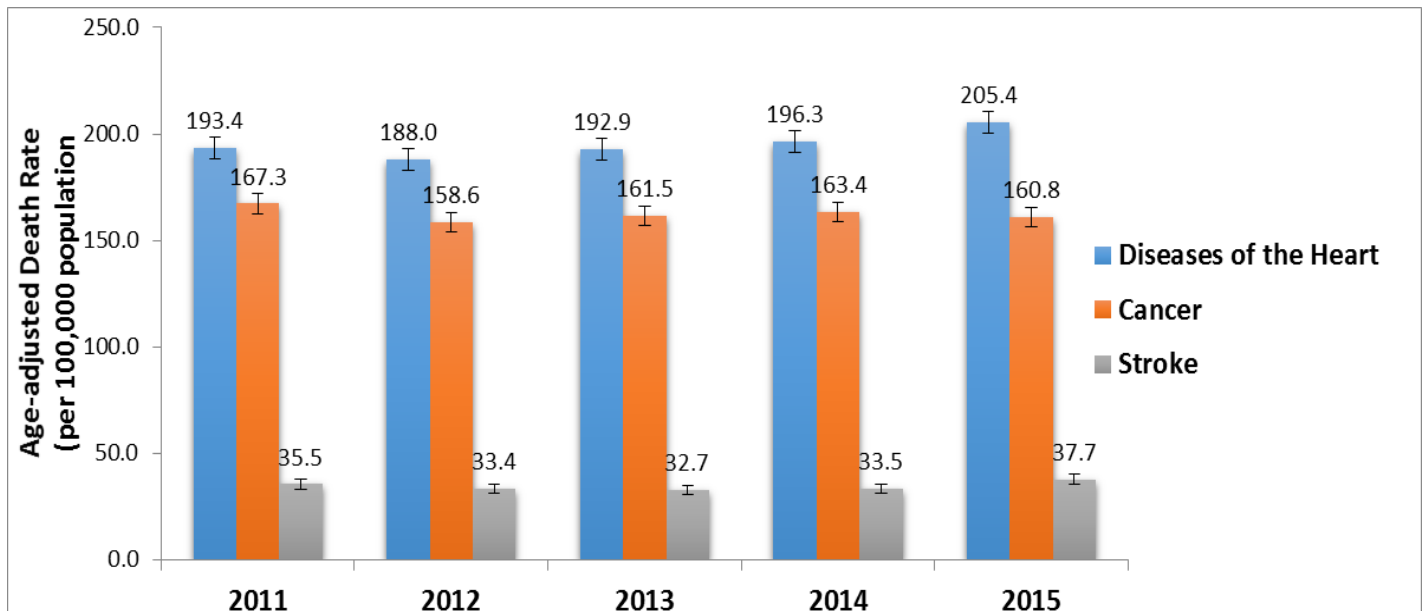
**Figure 4. Adults who have had a stroke by race/ethnicity, Nevada, 2013-2015: Pooled BRFSS data**



Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2013-2015.

Additionally, 2013-2015 pooled BRFSS data reflects an estimate of stroke prevalence in Nevada via self-reported stroke experience by race and ethnicity. As indicated in Figure 4, the health disparity in Nevada’s African American population is striking — more than double the stroke prevalence as compared to other ethnicities— and indicates a clear need to focus efforts on reducing this disparity.

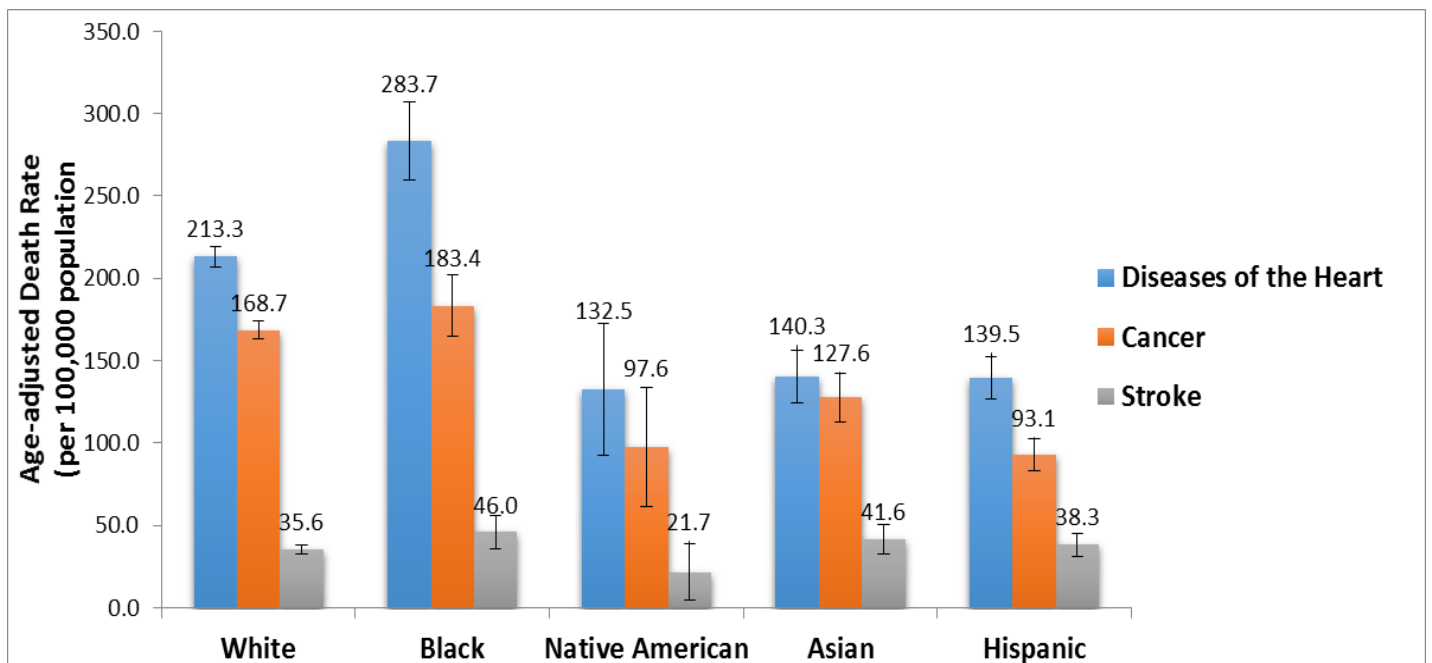
**Figure 5. Chronic Disease Mortality by Year, Nevada Residents, 2011-2015**



Source: Nevada Division of Public and Behavioral Health. Office of Public Health Informatics and Epidemiology, 2017.

Mortality related to stroke in Nevada from 2011-2015 can be seen in Figure 5. In 2015, stroke contributed to 5% of mortality statewide. Female mortality (38.2) exceeded male mortality (36.5) in the age-adjusted death rate per 100,000 population.<sup>4</sup>

**Figure 6. Chronic Disease Mortality by Race/Ethnicity, Nevada Residents, 2015**



Source: Nevada Division of Public and Behavioral Health. Office of Public Health Informatics and Epidemiology, 2017.

<sup>4</sup> Nevada Division of Public and Behavioral Health, Office of Public Health Informatics and Epidemiology, Quintiles. Data as of May 2016, 2016.



Again, the need to address racial/ethnic disparities in stroke mortality outcome is highlighted in Figure 6. The chronic disease mortality of African American Nevadans is almost 10% higher than that of white Nevadans, and the increased mortality experienced by Asian and Hispanic Nevadans are also in stark contrast to that of whites. In the *Minority Health Report: 2011-2014*,<sup>5</sup> published by the Office of Public Health Informatics and Epidemiology (OPHIE), proportions by race and ethnicity indicate a disparate stroke burden on Pacific Islanders/Native Hawaiians and African Americans which bears further exploration to identify ways to decrease stroke burden and deliver necessary services to these populations.

## Population and Limitations

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This report uses aggregate data from 15 participating stroke centers in Nevada, listed below. In 2015, the participating stroke centers treated 93.7% of all the strokes in Nevada (2015 discharge data includes the first two quarters of data only; in 2014, 92.9% of strokes treated were at the participating centers). In the hospital discharge data, all of the stroke-relevant International Classification of Diseases (ICD) codes hospitals can enter are reflected; however, hospitals have the option to sample their data, as well as enter only the ten stroke ICD codes the Centers for Medicare and Medicaid Services (CMS) and the Joint Commission review.

The data in this report is reflective only of the hospitals currently participating in the GWTG program, and therefore may not be generalized to the entire state of Nevada. Currently, the Nevada Stroke Registry is receiving individual hospital data from 10 of the 15 primary care stroke centers reporting into GWTG and aggregate view data from all 15. Additional limitations include incomplete data on the percentage of total stroke cases in Nevada and incomplete data fields for reported stroke cases. The provisions require only the primary care stroke centers within Nevada to report data into the stroke registry. Nevada currently houses 32 hospitals, of which 15 are primary care stroke centers per the AHA designations. Furthermore, the data accessed through GWTG is de-identified by nature and was not compiled in a fashion to allow comparison across different hospitals for this report. This data will be addressed for the purpose of developing quality improvement recommendations relative to the state of Nevada.

### Participating Nevada Hospitals (as of May 2017)

Centennial Hills Hospital \*  
Desert Springs Hospital \*  
Mountain View Hospital \*  
Northern Nevada Medical Center \*  
Renown Regional Medical Center \*  
St. Mary's Regional Medical Center  
St. Rose Dominican Hospital- Rosa de Lima  
St. Rose Dominican Hospital-San Martin  
St. Rose Dominican Hospital- Siena  
Southern Hills Hospital and Medical Center \*  
Spring Valley Hospital Medical Center \*  
Summerlin Hospital Medical Center \*  
Sunrise Hospital and Medical Center \*  
University Medical Center  
Valley Hospital Medical Center

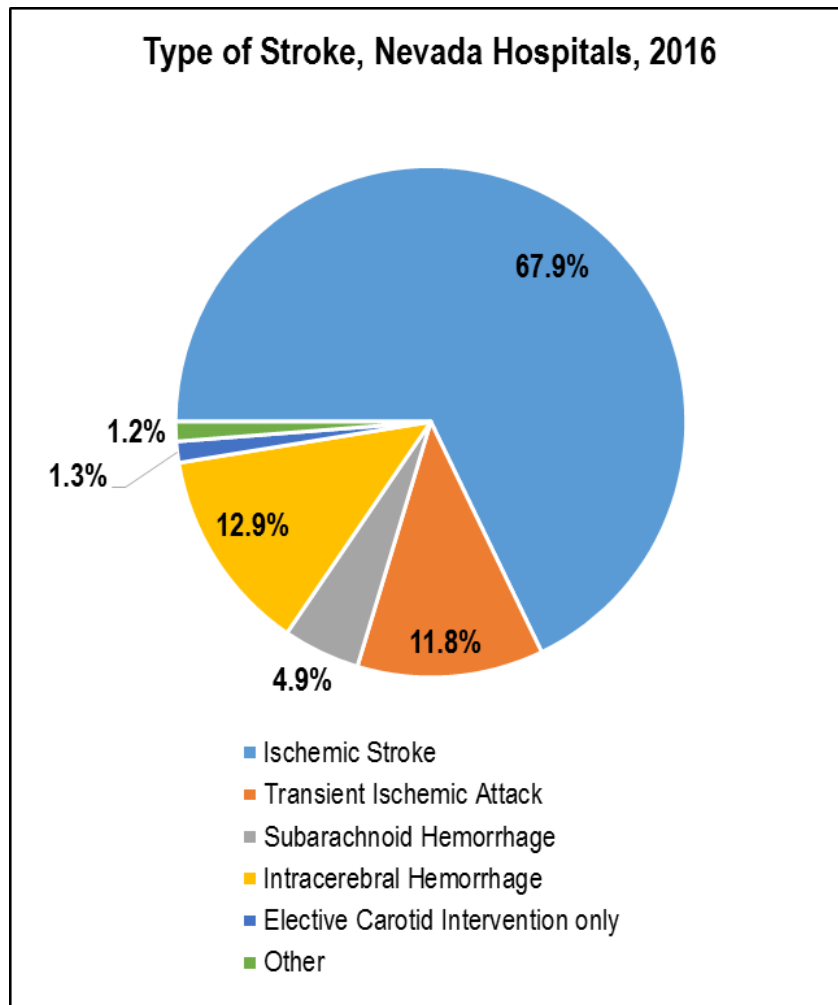
\* Denotes those centers that currently can be viewed individually in GWTG due to permission status.

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<sup>5</sup> Division of Public and Behavioral Health (2014). *Minority health report: 2011-2014*. Figure 9: Adults who have been told they have had a stroke. Retrieved from: [http://dpbh.nv.gov/Programs/OPHIE/Docs/minority\\_rpt/](http://dpbh.nv.gov/Programs/OPHIE/Docs/minority_rpt/)  
Nevada Stroke Registry: 2016 Data Summary

# Demographics

This report was compiled using de-identified patient data from GWTG-participating hospitals in Nevada for calendar year 2016. The figure below displays the percentage of cerebrovascular events in reporting Nevada hospitals. The most common type of stroke for 2016 was ischemic (67.9%), followed by intracerebral hemorrhage (12.9%), transient ischemic attack (TIA) (11.8%), subarachnoid hemorrhage (4.9%), and elective carotid intervention only (1.3%).



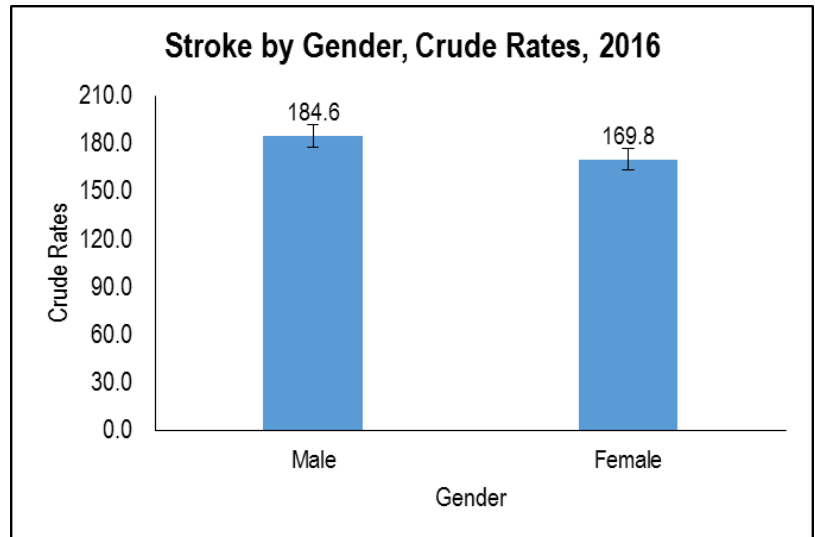
## Definitions

- **Cerebrovascular event:** a clinical syndrome caused by disruption of blood supply to the brain, characterized by rapidly developing signs of focal or global disturbance of cerebral functions, lasting for more than 24 hours or leading to death. A transient ischemic attack (TIA) refers to a similar presentation that resolves within 24 hours.
- **Ischemic Stroke (IS):** occurs when an artery to the brain is blocked resulting in inadequate blood supply and oxygen.
- **Transient Ischemic Attack (TIA):** occurs when a clot (typically blood) temporarily blocks an artery and part of the brain does not get the blood flow it needs. The symptoms occur rapidly and usually last for a short time (less than 24 hours) before resolving completely and leaving no permanent damage.
- **Subarachnoid Hemorrhage (SAH):** occurs when a blood vessel just outside the brain ruptures. The area of the skull surrounding the brain (the subarachnoid space) rapidly fills with blood.
- **Intracerebral Hemorrhage (ICH):** occurs when a blood vessel within the brain ruptures, allowing blood to leak inside the brain.
- **Elective Carotid Intervention Only:** elective definitive interventions include elective carotid endarterectomy, angioplasty, and carotid stenting.
- **Other:** includes stroke not otherwise specified, no stroke-related diagnosis, and missing diagnosis.

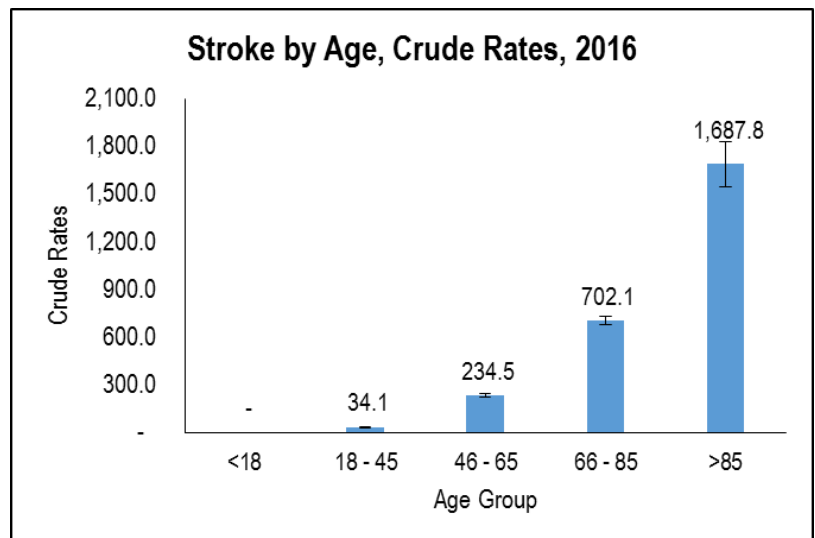
# Who is Affected?

The Nevada Stroke Registry provides information on stroke as it relates to gender and age group. The percent of strokes in males slightly exceeded that for females, and older age groups experienced much higher stroke burdens (crude rate is generated by dividing the total number of cases in a specific time period by the total number of people in the population).

When examining by gender, males (2,695 cases, 184.6 per 100,000 population) did not have significantly higher rates of strokes when compared to females (2,449 cases, 169.8 per 100,000 population).



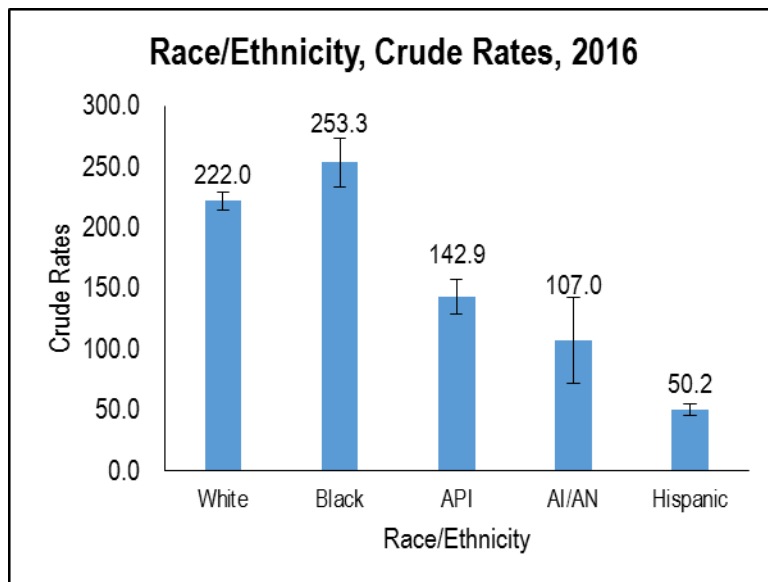
When examining the distribution of stroke by age group, those 85 years and older (553 cases, 1,687.8 per 100,000 population) had significantly higher rates of strokes when compared to all other age groups.



# Who is Affected?

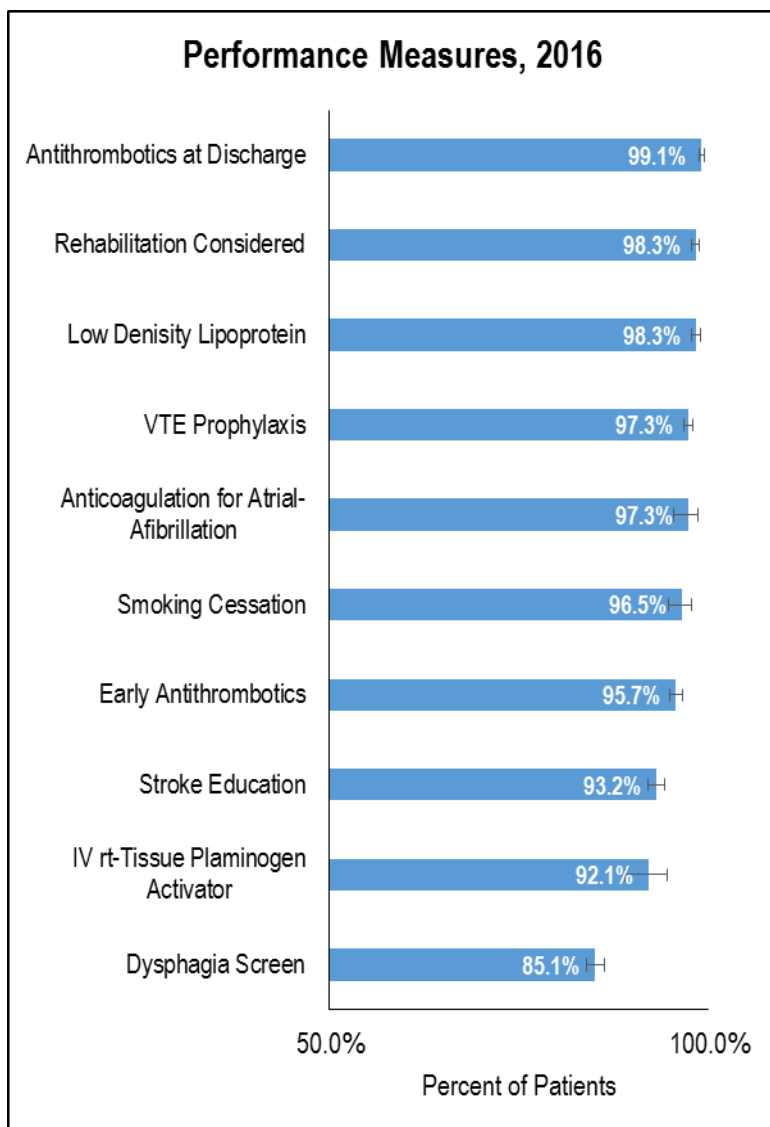
The Nevada Stroke Registry provides information on stroke as it relates to race and ethnicity (Hispanic and non-Hispanic). The percent of strokes in Black Nevadans exceeds that.

When examining the distribution of strokes by race/ethnicity, whites (3402 cases, 222.0 per 100,000 population) and blacks (626 cases, 253.3 cases per 100,000 population) had significantly higher rates of stroke when compared with all other racial and ethnic categories.



# Performance Measures

The performance measures listed below coincide with the Paul Coverdale core consensus measures and are based on GWTC data reported by Nevada stroke centers between January and December 2016. The performance measures were developed by the Joint Commission, AHA, and the Centers for Disease Control and Prevention (CDC) for optimal treatment of ischemic strokes. Some of the lower-scoring performance measures are discussed in more detail in the following section, as well additional performance measures beyond the core measures that indicate opportunities for statewide improvement. The core performance measures were examined by geographic location for the ten individually identifiable hospitals (northern region and southern region). Specific core measures had notable differences between regions from 2011-2015: stroke education (north at 99.6%, south at 95.5%), IV rt-PA administration (north 91.1% and south 94.5%), and early antithrombotics (north 98.5% and south 96.0%).



## Performance Measures

**Antithrombotics at discharge:** percentage of ischemic stroke or TIA patients prescribed antithrombotic medications (prophylactics that prevent clot formation) at discharge.

**Rehabilitation:** percentage of patients with stroke, evaluated for rehabilitation services including modalities within the hospital, subacute care, long-term care facility, home and outpatient therapies.

**Low Density Lipoprotein (LDL):** percentage of patients with LDL levels  $\geq 100$ , or not measured, or on cholesterol-reducer prior to admission, who are discharged on statin medication (cholesterol-reducing drugs).

**VTE Prophylaxis:** percentage of patients with ischemic stroke, hemorrhagic stroke, or like conditions who receive venous thromboembolism prophylaxis (VTE) the day of or day after hospital admission.

**Anticoagulation for Atrial Fibrillation:** percentage of patients with an ischemic stroke or TIA also presenting with atrial fibrillation and/or atrial flutter who are discharged on anticoagulation therapy (medication that prevents clotting).

**Smoking Cessation:** percentage of patients with history of tobacco product use who receive, or their caregivers receive, smoking cessation advice or counseling during hospital stay.

**Early Antithrombotics:** percentage of stroke or TIA patients who have received antithrombotic therapy by the end of admission day two.

**Stroke Education:** patients and/or caregivers provided with education and/or educational materials during the hospital stay addressing personal risk factors and warning signs of stroke, activation of emergency medical system, need for follow-up after discharge, and medications prescribed.

**IV rt-Tissue Plasminogen Activator (t-PA):** percentage of ischemic stroke patients who arrived at the hospital within two hours of their last known well time and received tissue plasminogen activator to dissolve clots and improve blood flow within three hours of last known well time.

**Dysphagia Screening:** percentage of patients screened for dysphagia (difficulty swallowing), using evidenced-based protocol, before allowing any foods, fluids, and/or medications orally.

# Dysphagia Screening

## Causes of Nutritional Impairment after Stroke

### Primary Factor

- Dysphagia

### Secondary Factor

- Upper limb paralysis
- Disturbance of sensory function
- Depression
- Cognitive changes affecting eating (e.g.; attention-concentration deficit, forgetting to eat, eating too fast or too slowly)

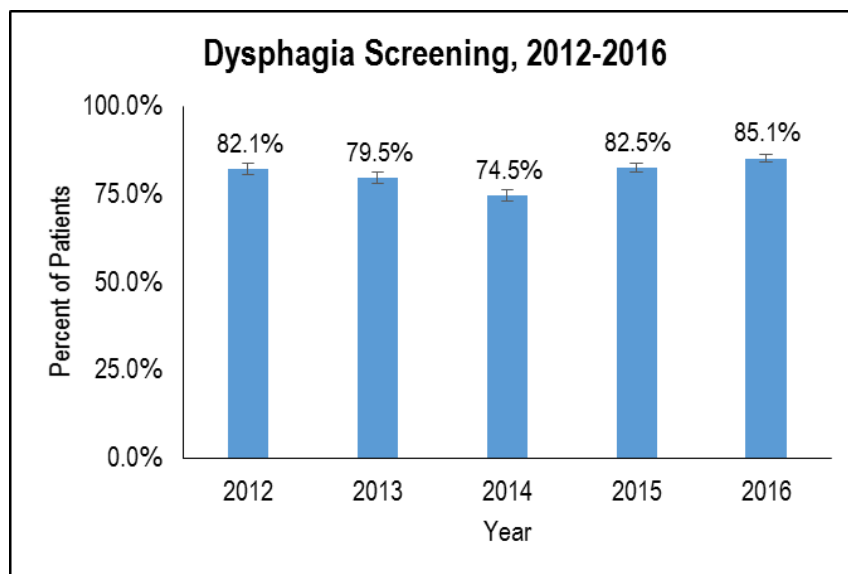
Dysphagia screening was the lowest-performing core measure. Promotion of the use of a dysphagia screening action plan by stroke stakeholders would be a route to improve performance on this measure.

### Dysphagia Screening Action Plan

Hospitals identify and recruit professionals to develop a stroke care team (e.g., speech therapist, occupational therapist, physical therapist, social worker, registered dietician, and nursing navigator) that develop policies to integrate evidenced-based dysphagia screenings into the stroke patient's care plan. In addition, the stroke care team participates in quarterly sessions addressing stroke education and training. The risk management and quality improvement teams closely monitor activities and deliver recommendations.

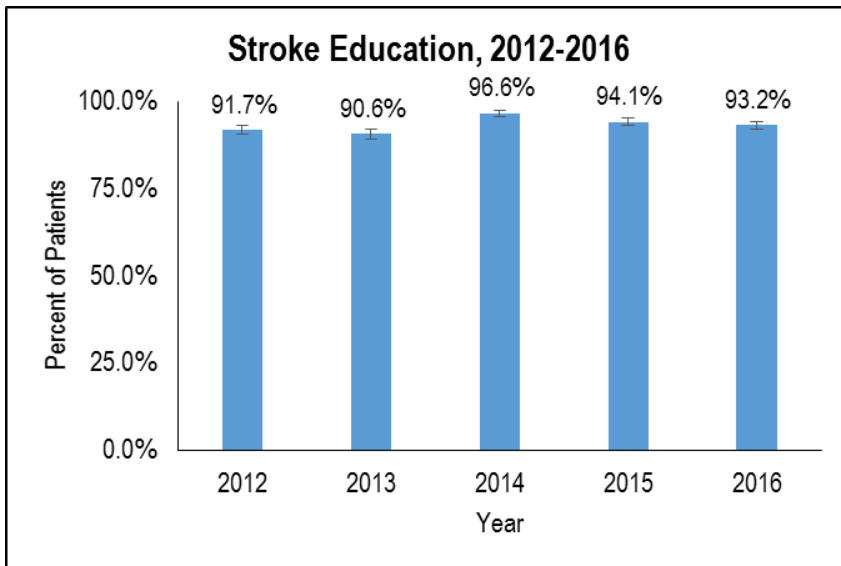
Dysphagia, or difficulty swallowing, is a common occurrence resulting from acute stroke. Early screening helps to identify stroke patients who could be vulnerable to weight loss, fluid depletion, malnutrition, and aspiration of food or liquid causing pneumonia. Patients who are unable to consume food or fluid by mouth often demonstrate poor outcomes and experience prolonged hospital stays including post-discharge long-term care facility admissions.

Dysphagia screenings in 2016 (85.1%) show a significant increase from 2014 (74.5%).



# Stroke Education

The percent of patients or their caregivers who were provided education addressing personal risk factors for stroke, warning signs for stroke, activation of emergency medical system, need for follow-up after discharge, and medications prescribed has increased from 87.0% in 2011 to 96.6% in 2014. However, a decrease in the percentage from 2014 to 2015 and again in 2016 was observed. Increasing efforts by all stroke stakeholders on stroke education across the stroke continuum of care (prevention, treatment, rehabilitation, decreasing readmissions, and re-occurrence) is key to raising this performance measure. Nevadans would benefit from a coordinated statewide effort to increase recognition of the signs of stroke and preventive behavior and lifestyle factors.



## Stroke Education

**Risk Factors for Stroke:** risk factors for stroke include, but are not limited to, using tobacco products, obesity, high blood pressure, high cholesterol (HDL), heart disease, diabetes, and sickle cell disease.

**High Blood Pressure:** increased pressure exerted within the blood vessels; systolic measurements.

### Warning Signs of Stroke:

- Sudden numbness or weakness of the face, arm, or leg, especially on one side of the body
- Sudden confusion, trouble speaking, or understanding
- Sudden trouble waking, dizziness, loss of balance, and/or coordination
- Sudden severe headache with no known cause

### Activation of Emergency Medical Systems:

If a patient experiences one or more signs/symptoms of a stroke, they should immediately call 9-1-1 and activate the emergency response system. Early access to advanced care and early definitive interventions are imperative for the best possible patient outcomes. Patients should arrive at the nearest appropriate acute care facility within one hour of the onset of signs and symptoms.

**Follow-up Care:** Patients who have suffered a stroke are at high risk of suffering additional strokes. Stroke care teams develop a plan of care for patients post discharge, including follow-up primary care visits, medication regimens, physical therapy, occupational therapy, and other services including support groups.

**Medication Adherence:** Patients are discharged on specific medication regimens after suffering a stroke to help prevent additional strokes. These medications may include antihypertensives, antithrombics, anticoagulation therapies, and antilipidemics.

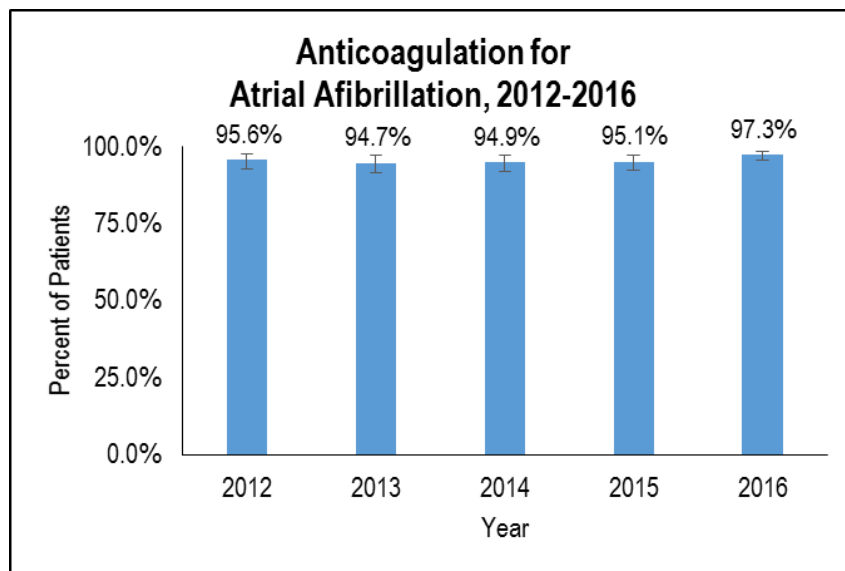
# Anticoagulants for Treatment of Atrial Fibrillation and Atrial Flutter

**Atrial Fibrillation:** an irregular heartbeat (or arrhythmia) that may result in blood clots, stroke, heart failure and other heart-related complications.

**Atrial Flutter:** arrhythmia due to problems with the electrical system of the heart originating in the atria.

**Anticoagulants:** drugs that slow the clotting process in the blood preventing blood clots from forming.

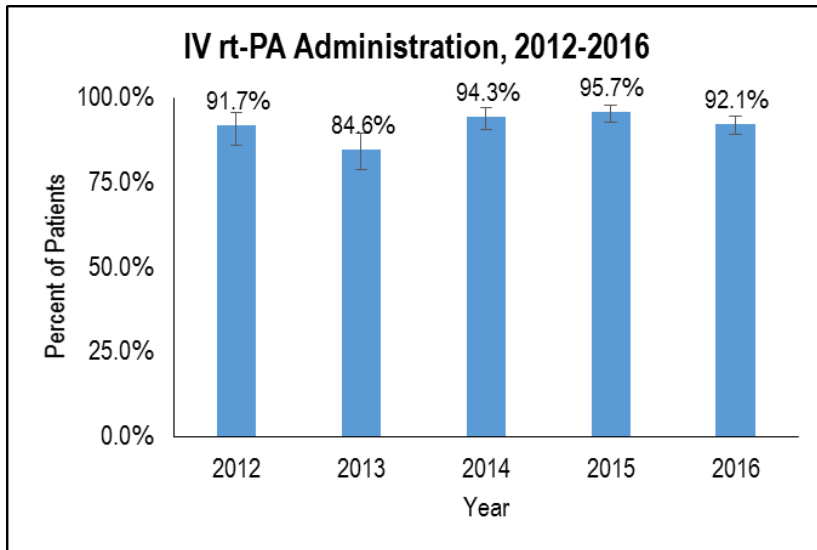
The percent of patients with an ischemic stroke or TIA with atrial fibrillation/flutter discharged on anticoagulation therapy has significantly changed in the past two years, after a four year period of no significant changes.





## IV t-PA Administration

IV t-PA administration for eligible patients increased from 91.7% in 2011 to 95.7% in 2015, but showed a drop of 3.2% from 2015 to 2016.



The IV t-PA administration performance measure reflects the percentage of ischemic stroke patients who arrived at the hospital within two hours of their last known well time and received tissue plasminogen activator to dissolve clots and improve blood flow within three hours of last known well time. Focused efforts aiming to increase awareness of the key time periods for administration, the benefits of use, and the importance of administration in a continuum of care may be productive routes to improving this performance measure, keeping in mind the contraindications listed in the sidebar.

## Contraindications for Administering IV t-PA

### Acute Intracranial Hemorrhage (ICH):

examples of ICH include subarachnoid hemorrhage, intraventricular hemorrhage, epidural hemorrhage, and subdural conversion of infarctions.

### History of ICH

### Severe Uncontrolled Hypertension

### Serious Head Trauma or Stroke in the Three Months Preceding the Admitting Stroke

### Myocardial Infarctions (MI) Within Three Months

### Thrombocytopenia and Coagulopathy

### Severe Hypoglycemia or Hyperglycemia

### Mild or Improving Stroke Symptoms

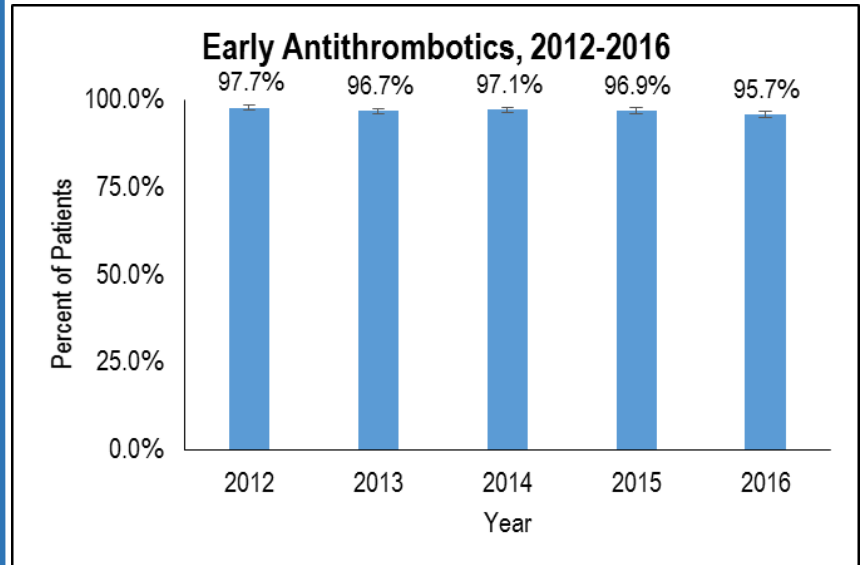
**More Than Four Hours since the Last Known Well Time:** time of onset of symptoms or time the patient was last known to be well or symptom-free.

# Early Antithrombotics

Early antithrombotic therapy (before the end of the second hospital day) has remained fairly constant from 2012-2016 as reflected by the Nevada Stroke Registry. However; a slight decrease has been noted in 2016. Early antithrombotic therapy is considered most effective after the first 24 hours for those experiencing acute ischemic stroke.

Focusing stroke stakeholder efforts on identification of barriers to use in appropriate conditions may be a path to increasing the outcome statewide on this performance measure.

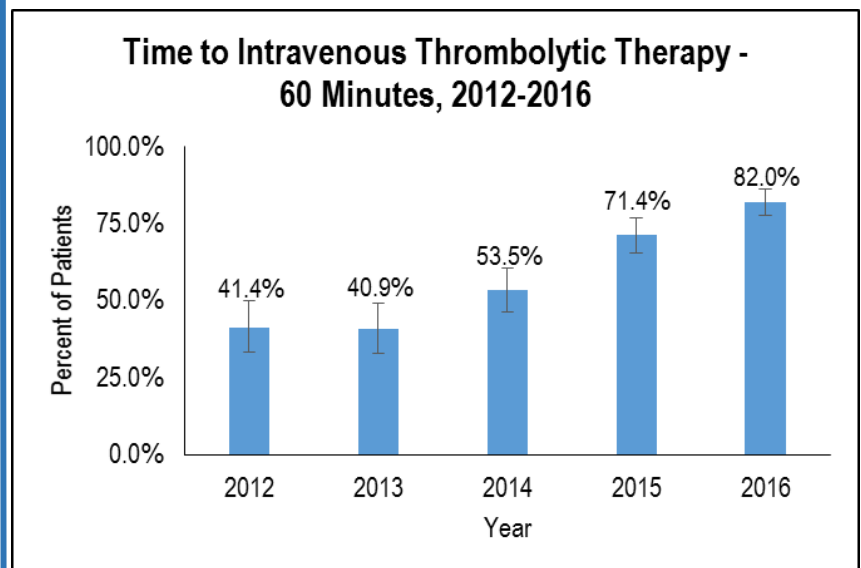
The percent of patients with an ischemic stroke or TIA who received antithrombotic therapy by the end of the second hospital day has not significantly changed in the past five years.



# Time to Intravenous Thrombolytic Therapy

The table to the right indicates the need to continue to increasing statewide performance on time to intravenous thrombolytic therapy within 60 minutes as an opportunity to improve stroke outcomes. Although this measure is not part of the core consensus measures, it highlights improving statewide performance over the past five years as well as an opportunity for more statewide quality improvement.

The percent of patients with an ischemic stroke or TIA who received antithrombotic therapy within 60 minutes has significantly improved in the past five years.

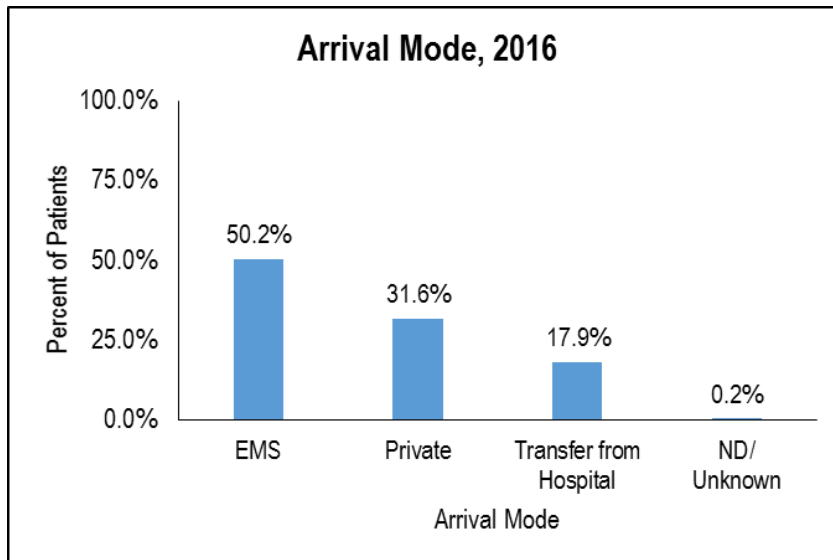


# Pre-Hospital Mode of Transport

## Notification and Response of EMS for Stroke

The notification and response of EMS to a stroke involves a complex interaction between the public, the applicable EMS program, and the relevant hospital emergency departments. The CDC recommends hospitals develop partnerships with local EMS providers and educate communities about the symptoms of stroke and the importance of dialing 9-1-1 when someone is experiencing symptoms of a stroke for timely treatment. It is also important for EMS and emergency dispatch operators to be trained in stroke symptom recognition and be able to assist these patients in quickly getting to the nearest hospital that can provide the drug IV t-PA within the three-hour window from symptom onset. Additional measures relating to arrival mode of transport are displayed below. Also, a measure relating to pre-notification by EMS indicates that, in 2016, 50.2% of stroke patient encounters involved hospital pre-notification by EMS, offering room for improvement to increase pre-notification rates statewide to maximize transitions along the stroke continuum of care.

In addition to mode of transport, a measure relating to last known well to arrival time offers opportunities for improvement to maximize survivorship and decrease disability burden. In 2015 GWTG data, last known well to arrival time averaged 138.5 minutes, offering opportunities to work on statewide reduction of the time period for this measure.



## Stroke Symptoms (With Acute Onset)

**Altered Mental Status:** patients suddenly become confused, disoriented, agitated, or unresponsive.

**Facial Droop:** patients develop a sudden onset of facial numbness or droop. This often happens to only one side of the face and can be accompanied by slurred speech or difficulty speaking.

**Dysphagia:** (difficulty swallowing) patients may suddenly lose the ability to swallow, feel like they are choking, and/or feel as if something is lodged in their throat.

**Hemiparesis or hemiplegia:** sudden onset of one-sided weakness and/or movement, usually beginning in the face and associated side of the body.

**Difficulty ambulating:** acute onset of stroke often leaves patients unable to walk due to hemiparesis, with a loss of coordination, or leaves them with an unsteady gait, increasing the risk of falls.

**Cephalgia:** sudden onset of severe headache or pain. Often times described as the worst "headache" of their life.

Anyone experiencing these symptoms or noticing these symptoms in another person should immediately **dial 9-1-1**. It is also important to note the time of symptom onset.

# Recommendations and Aggregated Data

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Below is a series of recommendations based on the 2016 aggregate Nevada Stroke Registry data:

- Currently only ten of the 15 facilities have completed and returned their Memorandum of Agreements (MOU) for data sharing/super-user allowance to Quintiles (vendor of GWTG). Two of the facilities' MOUs are pending processing at Quintiles.
  - Quality Improvement (QI) recommendation: Increase MOU agreements returned to DPBH by all 15 primary care stroke facilities in Nevada to enable viewing all 15 hospitals individual data.
  - QI recommendation: Explore use of the Health Information Exchange to collect data aligning with the 10 GWTG performance measures to include critical access hospitals and cross walking with GWTG data to get a comprehensive geographic representation of stroke in Nevada.
- Stroke case data is being reported for patients without all data being contributed (fields left empty or blank), likely unintentionally or due to the lack of data collection/documentation at time of service.
  - QI recommendation: Improve quality of reporting for individual stroke cases and ensure complete data is collected and reported. Consider increased training across the health care team as to what data elements are collected, why the reporting is important, how it benefits patient outcomes, and the value of a complete stroke registry for Nevada.
- Use aggregate data to address health disparities by ethnicity and race, gender, insurance status, and geographic location.
  - QI recommendation: Health disparities are evident in Nevada in relation to stroke prevalence and chronic disease mortality by race and ethnicity. Health disparities for stroke are most apparent among African American and Pacific Islanders/Native Hawaiian Nevadans. An emphasis must be placed on addressing racial and ethnic disparities relating to stroke prevention and care and contributing factors identified.
- The core performance measures were examined by geographic location for the ten currently individually identifiable hospitals (northern region and southern region). Specific core measures had notable differences between regions from 2012-2016: stroke education (north at 99.6%, south at 95.5%), IV t-PA administration (north 91.1% and south 94.5%), and early antithrombotics (north 98.5% and south 96.0%).
  - QI recommendation: Examining the data by geographic location can identify opportunities for targeted technical assistance and can reveal important differences between regions. Additional analysis could be conducted within geographic location.
- Reporting fatigue and numerous reporting requirements/demands are presenting barriers to effective and beneficial reporting of all stroke cases versus the current submission of limited stroke cases.
  - QI recommendation: Determine a quality improvement activity that will reduce reporting fatigue and requirements/demands to facilitate increased reporting to encompass all stroke cases encountered by each facility.
  - QI recommendation: Explore feasibility of the use a template for entering data from Electronic Health Records (EHRs) and develop data-sharing capability or importing-exporting functionality between the GWTG database platform and EHRs.
- Include stroke hospital pre-notification by EMS statewide to maximize transitions along the continuum of care.
- Continue to increase statewide performance on time to intravenous thrombolytic therapy within 60 minutes.
- Decrease last known well to arrival time to maximize survivorship and decrease disability burden.
- Explore interest on the part of the Nevada Heart and Stroke Taskforce in reviewing stroke registry data and making recommendations on quality improvement for possible incorporation into the Nevada Stroke Registry Report.

# Legislative Recommendations

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In SB 196 of the 78<sup>th</sup> Nevada Legislative Session, section 9, subsection 2, subsection b, the DPBH is required to provide “any recommendations for legislation to improve the quality of care provided to patients who suffer from strokes in the state.” Due to the delayed provision of super-user access to the DPBH Chief Biostatistician, data was received for analysis as of May 2, 2017. The DPBH does not recommend additional stroke quality improvement legislation at this time due to the need to address the limitations mentioned in this report, and the fact that access to the data was so recently attained. A better sense of the possible need to recommend additional legislation will be available over time and with additional utilization of the Nevada Stroke Registry. An updated Legislative Recommendation section will be available in the 2017 Nevada Stroke Registry report, which will be submitted to legislatively mandated entities by June 1, 2018.

## Summary

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Aggregate data collected in the Nevada Stroke Registry provides a much-needed opportunity to enhance stroke survivorship and reduce disability burden in Nevada through the identification of priority areas upon which to focus QI efforts. It also allows participating hospitals the opportunity to identify and celebrate areas of success and optimal implementation of QI measures with excellent performance measure outcomes. The results of the performance measures reported here, along with the recommendations above, are offered to address QI on a statewide scale, as opposed to the level of the individual hospital. Efforts of the CDPHP Section’s Heart Disease and Stroke Prevention Program, in concert with the efforts of the Nevada Heart and Stroke Taskforce and the Nevada AHA/ASA, will need to align in addressing QI opportunities for promoting and implementing enhanced stroke prevention and care along the continuum of stroke prevention education, optimal stroke treatment, and post-stroke care, particularly in regard to readmissions. Stroke-prevention education needs to address the importance of widespread stroke signs awareness, high blood pressure awareness and high cholesterol control (including medication adherence), smoking cessation, importance of physical activity and exercise, and diabetes control. Expansion of data collection to include EMS and rural Critical Access Hospitals to capture stroke data, hand in hand with efforts to promote the values of complete reporting and of all 15 hospitals opting into the Nevada Stroke Registry by sharing permission for the DPBH to view their GWTG data, will allow for more complete regional representation independent of facility size and location. Increased stroke-education efforts, particularly in relation to stroke burden and mortality health disparities and for the lowest-scoring performance measure (dysphagia screening), are needed with all stroke stakeholders working in concert to leverage resources and scope of impact. Closing the circle for seamless information flow from stroke education to stroke transit and hospital care to post-discharge care will be key to implementing QI at the health systems level statewide to ensure each Nevadan has the optimal experience to enhance survival and decrease disability burden in case of stroke.

# Acknowledgements

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Thank you to Mick Smith, Ron Loomis, and Ben Schmauss of the American Heart Association/American Stroke Association for their generous technical assistance and time.