5-1-2012

Program Evaluation of Stroke in Rural Nevada Hospital

Starla Cheri Ricks
University of Nevada, Las Vegas, sricks57@frontiernet.net

PROGRAM EVALUATION OF STROKE PROTOCOL

IN A RURAL NEVADA HOSPITAL

by

Starla Ricks

Bachelor of Science in Nursing
Great Basin College
2006

Master of Science in Nursing
University of Nevada, Las Vegas
2009

A doctoral project submitted in partial fulfillment
of the requirements for the

Doctor of Nursing Practice

School of Nursing
The Graduate College

University of Nevada, Las Vegas
May 2012

THE GRADUATE COLLEGE

We recommend the Doctoral Project prepared under our supervision by

Starla Ricks

entitled

Program Evaluation of a Stroke Protocol in a Rural Nevada Hospital

be accepted in partial fulfillment of the requirements for the degree of

Doctor of Nursing Practice
School of Nursing

Tish Smyer, Ph.D., Committee Chair

Susan Van Beuge, D.N.P., Committee Member

Richard Tandy, Ph.D., Graduate College Representative

Ronald Smith, Ph. D., Vice President for Research and Graduate Studies
and Dean of the Graduate College

May 2012

ABSTRACT

The overall goal of this Doctor of Nursing Practice (DNP) scholarly project is to complete a program evaluation using the Centers of Disease Control (CDC) Framework for Program Evaluation to measure the effectiveness of a stroke protocol in a rural Nevada hospital. This (DNP) scholarly project evaluates program strategies over third and fourth quarters of 2010 as well as the first, second, and third quarters of 2011, that have been initiated to reduce the burden of neurological disease with the application of a stroke protocol that complies with defined evidence-based strategies for assessment and management of stroke victims. As part of a continuous quality-improvement effort, the implementation of eight quality-of-care stroke measures have been monitored on a quarterly basis both pre and post initiation of the stroke protocol.

The program evaluation of stroke protocol in a rural Nevada hospital evaluates systematic ways to improve procedures that are useful, feasible, ethical, and accurate. Application of the Centers of Disease Control (CDC) Framework for Program Evaluation answers questions by selecting specific evaluation standards. The logic, reasoning, and values of evaluation that are reflected in this framework can lead to lasting impacts, such as basing decisions on experimentation instead of unfounded assumptions. The specific aim of this program evaluation was to analyze the start of a new program within a rural Nevada hospital, to produce information for evaluating the stroke program's effectiveness, and to use this information to make decisions about program refinement, revision, and /or continuation. The key to stroke recovery is through early intervention and treatment.

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CHAPTER I

Introduction

The Nevada State Health Division (NSHD) (2011) reports stroke as the third most common cause of death in the United States, preceded only by heart disease and cancer. There are five leading causes of death in Nevada (NSHD, 2011). These include heart disease, cancer, chronic lower respiratory disease, unintentional injuries, and stroke. The 2008 mortality rate due to stroke in Nevada is reported to be 40.2/100,000 U.S. Population (NSHD, 2011). According to the National Vital Statistics Report, 847 Nevadans died from stroke in 2006, constituting 4.5% of total deaths in Nevada (Kochanek, Jiaquan, Murphy, Minino, & Kung, 2011). In Nevada, approximately 10,000 people suffer strokes each year that cause significant morbidity and disability (NSHD, 2011).

Cardiovascular disorders, primarily strokes, are a major cause of disability and contribute to increases in health care costs due to the serious nature of neurological emergencies and the often necessary subsequent hospitalization (NSHD, 2011). Twenty-nine percent of all strokes are recurrent, and disability commonly manifests as a result. Twenty-nine percent of all strokes are recurrent, and disability commonly manifests as a result (Urden, Stacy, & Lough, 2009). When cerebral blood vessels become occluded by thrombus or embolus, or when intracranial hemorrhage occurs, the brain tissue becomes ischemic, resulting in a stroke (Wilson & Giddens, 2008). The key to stroke recovery and reducing stroke morbidity, mortality, and disability is through early preventive screening, early invention, and treatment (NSHD, 2011).

The estimated economic burden of stroke care is greater than $40 billion per year the U.S. (McCance & Huether, 2009). The Milken Institute (2007) released a recent study titled, *An Unhealthy America: The Economic Impact of Chronic Disease*. This study provided a report of Nevada's estimated medical costs for the treatment of stroke. The Milken Institute used statistics based on the 2003 Medical Expenditure Panel Survey data (NSHD, 2011). As of 2003, Nevada's annual cost burden from stroke totaled $700 million (Milken Institute, 2007). According to the Medical Expenditure Panel Survey data for Nevada Medicaid recipients (Milken, 2007, the cost of stroke treatment was estimated to be $31.7 million (Nevada Council State Legislatures, 2011).

There is a pressing need for research specific to Nevada regarding stroke to reduce this health disparity in incidence rates and case-mortality rates. The Nevada Integrated System of Stroke Prevention identifies three main goals for the prevention, treatment, and effective case management of stroke in Nevada. The Nevada Multidisciplinary Team (NSHD, 2011) identifies gaps in service by reviewing and evaluating current practices and policies. These goals are defined as follows:

1. Identification of all patients who receive treatment from Nevada emergency departments for possible acute stroke;

2. Promotion and support of quality improvement efforts, interventions, and system alterations, and

3. Systematic collection and analysis of data for the assessment of outcomes influenced by intervention (Assam, 2011).

In this program evaluation, an ischemic stroke protocol in a rural Nevada hospital has been evaluated. Ischemic stroke results from low cerebral blood flow (CBF), usually

caused by an occlusion of the blood vessel (Urden, Stacy, & Lough, 2009). The occlusion can be thrombotic or ischemic. Eighty percent of all strokes are ischemic (McCance & Huether, 2009).

Ischemic strokes are preventable, whereas most thrombotic strokes result from the accumulation of atherosclerotic plaque (Urden, Stacy, & Lough, 2009). “Improving the quality of stroke care is a global priority, despite the diverse healthcare economies across nations” (Joint Commission International, 2010, p. 2). The potential of information technology for quality improvement by developing new systems of data collection provide additional opportunities to track, trend, and compare stroke performance measures (American Heart Association, 2001). The importance of identifying stroke information strongly affects the course of events that establish quality of care. Progress toward the goal of a structured approach to performance improvement maximizes learning of overall practice performance and capabilities while reducing the number and severity of stroke symptoms (American Heart Association, 2001).

The stroke (STK) core measures were developed in collaboration with the American Heart Association (AHA)/American Stroke Association (ASA)/Brain Attack Coalition (BAC) for use by Disease-Specific Care (DSC)-certified primary stroke centers (The Joint Commission, 2011). The collaborative development process was facilitated by the expertise and advice of the Disease-Specific Care Stroke Advisory Panel guided by direction of the measure specifications with data elements contained in the AHA Get With The Guidelines (GWTG)-Stroke patient management tool and the Centers for Disease Control and Prevention (CDC) (The Joint Commission, 2011).

In health care performance, excellence requires that results are measured, trended, and compared with prior performance or best in the industry performance, and that best practices are deployed and aligned in a practice or on an organization-wide basis (American Heart Association, 2001). A standard set of core performance stroke measures can facilitate a common language that promotes benchmarking and sharing of best practices (American Heart Association, 2001). The Joint Commission (TJC) (2011) adopted and required reporting on the eight stroke (STK) core performance measure set, which are often referred to as core measures. Core performance measures are a common set of measurement specifications (See Appendix B). Prompted by the requirement that stroke core performance measures are reported, this rural Nevada hospital's stroke protocol has been adjusted for compliance with Joint Commission on Accreditation of Healthcare Organizations (JACHO). The JACHO is an independent organization that accredits and certifies health-care organizations, and makes program recommendations that meet the Centers for Medicare and Medicaid Service (CMS) regulations for reimbursement. The measure set is applicable to patients with the international classification diagnoses of ischemic stroke (See Appendix C) designed to promote international comparability in the collection, processing, classification, and presentation of mortality statistics (CDC, 2011b).

Problem Statement

Initial STK core performance measure data in the third quarter of 2010 reported that one out of four stroke patients received venous thromboembolism prophylaxis (VTE), in a manner compliant with treatment recommended by JACHO and CMS. The National Quality Forum (NQF) a nonprofit organization that operates to improve the quality of

healthcare and TJC consider VTE to be the most common preventable cause of hospital-related death, with an estimated 300,000 VTE-related deaths annually (Michota, 2007). This data prompted a need for immediate action including policy adaption and use of telemedicine.

The stroke protocol (See Appendix D) for patients in this rural Nevada hospital was initiated for patients reporting to the emergency department with any or all of the following eight stroke symptoms: (a) altered state of consciousness; (b) aphasia, or other higher cognitive disturbance; (c) dysarthia; (d) facial weakness or asymmetry; (e) lack of coordination, weakness, paralysis, or sensory loss of one or more limbs; (f) ataxia, poor balance, clumsiness, or difficulty walking; (g) visual loss; and (h) vertigo, double vision, unilateral hearing loss, nausea, vomiting, headache, photophobia, or phonophobia.

The stroke protocol was adapted to serve a rural population without the benefit of specialized service providers. The northeastern region of Nevada is without a neurologist. Plans for the implementation of the adapted stroke protocol, including the use of telemedicine for consultation and examination, were planned for implementation in April, 2011 as a means of providing medical care. Electronic communication requires the acquisition and use of advanced and interactive telecommunication equipment that permits direct communication between the patient and the physician at the remote site (Centers for Medicare & Medicaid Services, 2010).

Initial plans for partnership with a Nevada certified stroke center were met with difficulty and ultimately failed in an attempt to contract services with a neurologist, neurology group, and health care organization. Plans have continued to promote partnerships at the local and state level in order to provide quality stroke care to the rural

population of northeastern Nevada. There are nine primary stroke centers in Nevada, eight in Clark County, and one in Washoe County (NSHD, 2011). The particular rural Nevada hospital involved in the study is more than 300 miles from the nearest Nevada stroke center (U.S. Census Bureau, 2011a).

This program evaluation, based on the CDC Framework for Program Evaluation, analyzed the start of a new program within a rural Nevada hospital that provided information for evaluating the stroke program's effectiveness, and used information to make decisions about program refinement, revisions, and /or continuation (See Appendix E).

CHAPTER II

Review of the Literature

Researchers make the point of explaining the significance of supporting early stoke intervention and treatment. The incidence of stroke affects 5,000 people each year, and 5-14% of the survivors will experience a second stroke within one year of the first stroke (McCance & Huether, 2009). Rural populations have been identified as being particularly vulnerable to stroke (U.S. Census Bureau, 2011b). The CDC (1999) estimates from the National Health Survey that stroke in the United States is 1.45 times more prevalent in rural than urban areas. Strong, Mathers, and Bonita (2007) indicate that adherence to best-practice stroke care guidelines would reduce the incidence of stroke by 80%. However, despite the availability of the National Stroke Guidelines, only 50% of rural hospitals are reported to use them (Joubert, et al., 2008).

Eighty percent of strokes are ischemic, with the three main causes including atherosclerotic disease of large extracranial, intracranial vessels, occlusion of intracranial vessels by emboli from a cardiac source, and small vessel intracranial occlusive disease from hypertension and diabetes (Burke & Laramie, 2004). Ischemic stroke patients treated with thrombolytic therapy such as t-PA within three hours of onset experience significantly improved outcomes and irreversible neuronal damage (Burke & Laramie, 2004). Considering that time is of great importance in terms of the reversibility of brain ischemia, treatment needs to be initiated promptly (McCance & Huether, 2009).

Implementation of best-practice recommendations for stroke management in rural areas is often suboptimal (American Heart Association, 2008). The quality of stroke services for rural patients is variable with contributing factors that can include difficult

terrain, long distances to hospitals, poor transportation and communications, traditional practices, lack of medical services and personnel, and lack of equipment, lack of hospitalization, and financial support (American Heart Association, 2008).

Organizations such as the American Evaluation Association (AEA) are devoted to the application and exploration of program evaluation, personnel evaluation, technology, and many other forms of evaluation. The AEA (2008) believes that "evaluation involves assessing the strengths and weaknesses of programs, policies, personnel, products, and organizations to improve their effectiveness" (p. 7). Additionally, the AEA (2008) advises that program evaluation increases and promotes use of evaluation data, while contributing to theory and knowledge development of effective human action. Program evaluation is an essential organizational practice in public health, however, it is not practiced consistently across program areas, nor is it well-integrated into the day-to-day management of most programs (CDC Evaluation Working Group, 2008). Program evaluation is also necessary to fulfill CDC's operating principles for public health, which include using science as a basis for decision-making and action, expanding the quest for social equity, performing effectively as a service agency, making efforts outcome-oriented, and being accountable (CDC Evaluation Working Group, 2008). This analysis establishes and creates research credibility for program evaluations.

The CDC Evaluation Working Group suggests that evidenced based research, particularly in program evaluation, is important for its management and improvement. Additionally, this working group identified the need for the development of plans, partnerships, and feedback systems that provide a path for learning and ongoing improvement (CDC Evaluation Working Group, 2008).

The CDC Framework for Program Evaluation is described as a "driving force for planning effective strategies, improving existing programs, and demonstrating the results of resource investments" (U.S. Department of Health and Human Services, 1999, p. 1). The recommended framework facilitates an integration of program evaluation that can be used to promote health and prevent disease and injury. The U.S. Department of Health and Human Services (1999) describe the CDC Framework for Program Evaluation as applicable to almost any organized public health activity including systems, policy development activities, outbreak investigations, laboratory diagnostics, communication campaigns, infrastructure building projects, training and educational services, and administrative systems.

In 2003, the CDC Framework for Program Evaluation was used to assess tuberculosis contact investigation programs in Massachusetts. In this program evaluation three of the six steps of the CDC's framework were utilized to engage and identify stakeholders, create a logic model describing the tuberculosis program components, and develop self-evaluation tools. Conclusion findings credit the CDC framework with providing a useful methodology for beginning the assessment of tuberculosis contact investigation programs with findings used to target areas in need of improvement (Boutotte, Wilce, & Etkind, 2003).

In 2005, the Diabetes Primary Prevention Initiative Interventions Focus Area implemented the CDC Framework for Program Evaluation in five state-level diabetes prevention and control programs to translate diabetes primary prevention trails (Porterfield, Hinnant, Stevens, & Moy, 2005). Evaluation findings summarized recommendations for future community-based diabetes prevention initiatives, and

identified the need to strengthen clinical-community partnerships for the referral of people to evidence-based lifestyle programs (Porterfield, Hinnant, Stevens, & Moy, 2010).

In 2010, New York State Department of Health announced plans to eliminate childhood lead poisoning by developing and implementing an evaluation of the lead elimination plan. The CDC Framework for Program Evaluation was chosen as the design for the evaluation, and will be utilized to measure progress, accomplishment of specific plan components, overall coordination of plan efforts, and statewide outcomes (New York State Department of Health, 2010). Evaluation findings will be used to refine and improve the elimination plan.

As can be seen the CDC framework contributes to the achievement of research that is useful in program evaluation processes. Program evaluation can emerge from a variety of sources and settings all of which have an emphasis on the significant usefulness and importance of evidenced based practice to generate positive outcomes.

Needs Assessment

The Department of Health and Human Services Centers (DHHS) for the CDC Heart Disease and Stroke maps the applications of data for heart disease and stroke mortality and hospitalization rates. This application allows for the visualization of national, state, and county rates for stroke mortality and resulting hospitalizations (See Appendix E & F). Nevada state statistics report stroke death rates from 2000-2006 as 94% of the total population of 35 year olds and older (totaling1,269,670), compared to the national stroke death rate of 98%. Elko County Nevada is reported as having one of the lowest stroke

hospitalization rates in the state, although has the second highest stroke mortality rate in the state (CDC, 2011a).

Casper, Wing, Anda, Knowles, and Polland (2011) list the disease determinants for stroke as:

1. Medical diagnosis
    - Hypertension
    - Hyperlipidemia
    - Cardiovascular disease
    - Diabetes mellitus
    - History of stroke or transient ischemic attack
    - Hematological disorder
2. Individual lifestyle and behaviors
    - Smoking
    - Alcohol consumption
    - Sedentary lifestyle
    - Inadequate nutrition
3. Genetic predisposition includes
    - Family history of heart disease, high blood pressure, and stroke
    - Gender: At a younger age men are at a higher risk of stroke than women. At an older age female are more likely to have a stroke than men.
    - Race/ethnicity: At a younger age African Americans, Hispanics, and American Indian/Alaska Natives are more likely to a have a stroke than non-Hispanics, Asians or Caucasians (Casper, et al., 2011).

The NSHD (2011) report gives a descriptive analysis of the epidemiology of stroke in Nevada. Other sources of analysis include Nevada Behavioral Risk Factors Surveillance Survey (BRFSS), and Centers of Disease Control and Prevention (CDC). The stroke prevalence and frequency rates were analyzed in accordance with age groups, gender, race/ethnicity, and educational level by BRFSS. Members of the population aged 18 years and older were selected for the analysis. According to the data, the stroke prevalence differed in relation to racial/ethnic groups, education level, and income level. The incidence of stroke is higher in the aged population. The 65 and older age group demonstrated a higher prevalence of stroke than the group of persons aged 18-44 years. The number of women having had a stroke have a longer life expectancy than that of men (Assam, 2011).

A lower stroke prevalence rate was seen in the more highly educated portion of the population, as compared to the portion of the population with less than a high school education. Stroke was also observed to occur more frequently among African Americans (4.7%) than Hispanics (0.77%) and Caucasians (2.63%). There was a significant difference in stroke prevalence observed in different areas of Nevada (NSHD, 2011). Research provides important contributory data to further understand and clarify this health disparity in relation to demographics of the defined population.

Population identification. As of the 2009 census, the population of Elko County, Nevada was 47,896 with 15,638 households, and 11,493 families residing in the county (U.S. Census Bureau, 2011a). The U.S. Census Bureau defines rural as a term of exclusion (American Heart Association, 2008). Elko, County, Nevada has a land area of 17,179.03 square miles with 2.6 persons per square mile (U.S. Census Bureau, 2011a).

This rural Nevada hospital is located in Elko, Nevada, which is 300 miles east of Reno, Nevada, 240 miles west of Salt Lake City, Utah, and 250 miles south of Boise, Idaho. It is important to understand that areas in rural Nevada surrounding Elko lack accessible healthcare services and specialty care is very limited. Maintaining an optimal level of care is crucial because stroke patients in the rural Nevada area access services through this hospital's emergency room.

Prior to the start of the third quarter of 2010, stroke evaluation and treatment was left to the discretion of the emergency room physician, and included air transport time of a minimum of one hour to the nearest facility providing neurological care. In the past methods used to provide stroke care services, lacked a standard set of clinical measures for providers, health systems, and payers used to monitor the quality of care (American Heart Association, 2001). As the health care system has changed with the demand of high quality standards, so has this rural Nevada hospital's search for ways to deliver care and simultaneously gain efficiency.

Identification of project sponsor and key stakeholders. The stroke protocol is funded by the rural Nevada hospital and directs the evaluation of stroke patients in hopes of the institution of rapid, informed guideline protocols. Additional stakeholders include clinical professionals and health care consumers. This organizational chart is available in Appendix H.

Organizational assessment. The roles of organizations endeavoring to create a culture of quality and continuous improvement cannot be underestimated (Baker, 2009). At the prompting of mandatory reporting of stroke core performance measures this rural Nevada hospital's stroke protocol has been adjusted to accommodate Joint Commission

on Accreditation of Healthcare Organizations (JACHO) recommendations, and to meet Centers for Medicare and Medicaid Service (CMS) regulations for reimbursement. Mandatory reporting and potential loss of reimbursement for care if noncompliant with evidence based practice STK measures prompted a need for immediate action including policy adaption.

Assessment of available resources. Hospital privilege has been granted to participate in the review and gathering of Stroke Core Performance Measures which consists of CMS reportable data as part of continuous quality improvement.

Team selection and formation. Consideration was given regarding organizational team activities designed to generated the best outcomes, acknowledging the six basic roles in a quality improvement team: team leader, team member, recorder, timekeeper, quality advisor, and executive champion. The nursing quality director was charged with the task of developing a process to adapt a stroke protocol that would meet mandatory compliance recommendations for reimbursement. The team members included managing information technology, nursing supervisors and nursing directors from the emergency room, medical, surgical, pediatric, obstetrics, and intensive care unit. The Chief Nursing Officer and Quality Director served as the executive champions.

Cost benefit analysis. Economics of health care delivery are the lifeline for health care organizations and providers. The estimated economic cost of stroke care is greater than $40 billion per year (McCance & Huether, 2009). According to Medical Expenditure Panel Survey data for Nevada Medicaid recipients the price of stroke was estimated to be $31.7 million (NSHD, 2011). Knowledge of the current and expected quality measures for compliance with Continuous Quality Improvement (CQI) positively improves care

and controls cost (McLaughlin & Kaluzny, 2006). Pressure to increase quality and lower costs is coming from accreditation agencies, the public, the media, insurers, and governmental agencies (McLaughlin & Kaluzny, 2006.) The Patient Protection and Affordable Care Act (PPACA) of 2010, better known as healthcare reform, was designed to change our health delivery system. A major challenge affecting healthcare organizations and providers is the implementation of new payment models. Health reform moves healthcare organizations and providers from the traditional fee-for-service environment to an accountable care environment that ties reimbursement to quality. This does several things; it increases quality, decreases costs, and pays for performance (Christensen, Grossman, & Hwang, 2009). The accountable care model/delivery payment system requires healthcare organizations to be responsible for coordinating care to improve patient outcomes. Healthcare organizations are held accountable for the care they give and reimbursement is impacted by the quality of care delivered.

Accountable Care Organizations (2009) describe a growing consensus of efforts to improve care and foster greater accountability for both quality and cost and include several guiding principles for reform, such as require local accountability, allow for variation in strategies that local health care systems use to improve care, and promote improved care at a lower cost.

Stroke core measures provide evidence based patient care that is shown to produce the best outcomes. Organizational fiscal needs are based on service growth and intensity. Compliance data is publicly reported. Quality has become an important component in the evaluation of healthcare organizations and is necessary to reduce avoidable complications and unnecessary costs. Sustainable growth is achieved through quality care. Voluntary

reporting of data allows for maximum reimbursement. Efforts to measure and improve quality are what make CQI successful.

Defining the scope of the project. This program evaluation based on the CDC Framework for Program Evaluation is used to analyze the start of a new program within a rural Nevada hospital to produce information for evaluating the stroke program's effectiveness and to use this information to make decisions about program refinement, revisions, and /or continuation.

Project evaluation questions. A set of 10 Stroke (STK) performance measures derived from published care guidelines and clinical trials. Eight of the 10 measures received endorsement and inclusion by the National Quality Forum (NQF) and CMS as evidenced-based measures of care. All measures were adopted except STK-7 dysphagia screening and STK-9 smoking cessation. Although swallowing assessment is important for many patients for the prevention of aspiration pneumonia, dysphagia screening was not endorsed by the NFQ because the screenings are currently not well defined and use varying techniques, lack of a valid, reliable, standardized screening tool or process that is supported by research, and the reviewed literature showed that 50% of African Americans were under represented (LaBresh, 2008). Smoking cessation is a core performance outcome measure for hospitals that mandates the documentation of the tobacco-use status of all admitted patients (The Joint Commission, 2011). Hospital are required to provide both cessation counseling and medication during hospitalization for all identified tobacco users.

Evaluation questions include the Stroke (STK) Core Performance Measure Set:

- STK-1 Venous Thromboembolism (VTE) prophylaxis
- STK-2 Discharged on antithrombotic therapy
- STK-3 Anticoagulation therapy for atrial fibrillation/flutter
- STK-4 Thrombolytic therapy
- STK-5 Antithrombotic therapy by end of hospital day 2
- STK-6 Discharged on statin medication
- STK-8 Stroke education
- STK-10 Assessed for rehabilitation

Policy implications. Hospitals that participate with Medicare and Medicaid services are required to successfully undergo Joint Commission accreditation. Healthcare payors expect hospitals providing services to not only comply with controls and standards but to also furnish measurable assurance (Joint Commission International, 2010).

If the patient onset is within two hours of arrival, the patient must have thrombolytic treatment within one hundred eighty minutes of onset or the healthcare facility must provide a documented contraindication. Thrombolytic therapy is the use of drugs to break up or dissolve blood clots, which are the main cause of stroke (National Institutes of Health, 2011). Venous Thromboembolism Prophylaxis (VTE) must be administered the day of admission or the day after for non-ambulatory patients or a documented contraindication. Ischemic stroke patients must have antithrombotic therapy administered by end of day two or a documented contraindication. Patients must be assessed for rehabilitation services or a documented contraindication. Stroke/Transient Ischemic Attack (TIA) patients are required to have neurological checks every two hours for

assessment of neurological deficits. Low-density lipoprotein (LDL) must be measured in the first 48 hours of arrival. Antithrombotic therapy must be prescribed at discharge or a documented contraindication. Patients with atrial fibrillation/flutter a cardiac irregularity must have anticoagulation therapy to decrease the risk of developing a blood clot at discharge or a documented contraindication. Ischemic stroke patients with an LDL greater than or equal to 100mg/dl, or LDL not measured or patients who were on lipid lowering medication prior to hospital arrival need to be discharged on a HMG-CoA Reductase Inhibitor (Statins) medication or a documented contraindication. Statins decrease blood clot formation. There are several instances when statins are contraindicated such as with active liver disease and during pregnancy (Arcangelo & Peterson, 2006).

Procedure.

- Step one: Engage key stakeholders such as those involved in program operations, those served or affected by the program, and those who are intended users of evaluation findings (U.S. Department of Health and Human Services, 2005). Obtain a formal letter of hospital approval for evaluation of stroke program (See Appendix G). The program stakeholders include the hospital, clinical professionals, and health care consumers. Create an established organizational chart (See Appendix H).

- Step two: Describe the program with a comprehensive description clarifying need, targets, outcomes, activities, and resources. (U.S. Department of Health and Human Services, 2005). Standards of accuracy and propriety apply most directly to describing the program (U.S. Department of Health and Human Services, 2005). This program evaluation describes program strategies over the third and fourth quarters of 2010 as well

as the first, second, and third quarters of 2011, that have been and will be initiated to reduce the burden of neurological disease with the application of a stroke protocol that complies with defined goals for the assessment and management of stroke victims.

- Step three: Focus the evaluation design with stakeholders to define purpose and uses of evaluation (U.S. Department of Health and Human Services, 2005). Application of the Centers of Disease Control (CDC) Framework for Program Evaluation will answer questions by selecting evaluation strategies that are useful, feasible, ethical, and accurate.
- Step four: Gather credible evidence including consideration of indicators, sources of evidence/ methods of data collection, quality, quantity, and logistics (U.S. Department of Health and Human Services, 2005). The program evaluator, with the assistance of the hospital's utilization review board, will select patient charts at the end of each quarter based on the ICD code table for stroke diagnoses. For the purpose of this program evaluation, Starla Ricks MSN, FNP-BC will function as the program evaluator. The Stroke Core Performance Measures which consists of Joint Commission & CMS reportable data, which will be abstracted to determine whether measures have or have not been met. Data abstraction will take place following the last day of the previous quarter. Compilation of data and interpretation of data based on stroke performance measures.
- Step 5: Justify conclusions by "analyzing the evidence, making claims about the program based on the analysis, and justifying the claims by comparing the evidence against stakeholder values" (U.S. Department of Health and Human Services, 2005). Compare quarterly core performance measures.
- Step 6: Ensure use of evaluation findings and shared lessons learned to improve program. Five elements important to usefulness include providing recommendations,

preparation, feedback, follow up, and dissemination (U.S. Department of Health and Human Services, 2005). Final evaluation of program based on data findings. Standards of utility, propriety, and accuracy most directly relate to ensuring use and sharing lessons learned (U.S. Department of Health and Human Services, 2005).

Mission, Goals, and Objectives Statements

This program evaluation of stroke protocol in a rural Nevada hospital evaluates a systematic way to improve and account for actions that involve procedures that are useful, feasible, ethical, and accurate. Compliance with defined goals for assessment and management are essential in the determination of financial reimbursement for care within this practice setting. Application of the Centers of Disease Control (CDC) Framework for Program Evaluation answers questions by selecting evaluation standards that are useful, feasible, ethical, and accurate. The logic, reasoning, and values of evaluation that are reflected in this framework can lead to lasting impacts, such as basing decisions on systematic judgments instead of unfounded assumptions. The specific aim of this project is to analyze the start of a new program within a rural Nevada hospital to produce information for evaluating the stroke program's effectiveness and to use this information to make decisions about program refinement, revisions, and /or continuation. The key to stroke recovery is through early intervention and treatment.

CHAPTER III

Theoretical Underpinnings of the Project

The recommended Framework for Program Evaluation is the Centers of Disease Control (CDC) model of program evaluation [see Appendix E] (Mateo & Kirchhoff, 2009). The CDC model was constructed to ensure that amid the complex transitions in health care, program directors, sponsors, and leaders remain accountable and committed to achieving measurable health outcomes (Billings, 2000; CDC Evaluation Working Group, 2008; Boutotte, Wilce, & Etkind, 2003).

Mateo and Kirchhoff's (2009) describe the Framework for Program Evaluation as a practical, non-prescriptive tool, designed to summarize and organize the essential elements of program evaluation. The Framework for Program Evaluation is useful when performing program evaluations. After data are collected, findings will be reviewed, and the degree to which criteria was met will be evaluated. Expected standards of program evaluation hinge upon four core concepts, which are central to the framework: utility, feasibility, propriety, and accuracy (Mateo & Kirchhoff, 2009).

Underlying the CDC Framework for Program Evaluation are the five guiding principles of systematic inquiry, competence, integrity and honesty, respect for people, and commitment to public welfare, and are adapted from the CDC 1999. The American Evaluation Association (2008) proposes that such principles guide professional evaluation and are clearly defined to the public.

Major concepts described in the CDC Framework for Program Evaluation are used to describe the program evaluation steps (CDC Evaluation Working Group, 2008). Steps for formative and summative evaluation include engaging stakeholders, describing the

program, focusing the evaluation plan, gathering credible evidence, and justifying conclusions.

Theory to Support Change

In healthcare, the real goal is to always provide better patient care. Change potentiates the possibility of accomplishing this goal. Decisions about the quality of clinical outcomes take into account quality concern, improvement opportunities, and whether there is evidence to support considering a change. Hinshaw and Grady (2011) reminds us that despite the knowledge that evidence-based practice (EBP) improves healthcare quality and reduces morbidities, mortality, costs, and geographic variation of healthcare services, it is not standard practice in numerous health systems across the United States.

Hinshaw and Grady (2011) further elaborate on the viewpoint that "many clinicians in a multitude of settings across the care continuum continue to deliver care to their patients based upon tradition, information that was learned years before in their educational programs, and outdated policies and procedures that exist in institutions" (p. 87). Change is required when implementing a continuous quality improvement initiative (Zaccagnini & White, 2011).

One of the earliest and perhaps the most useful change method theories is Lewin's (1951) force-field model that identified three phases of change: first, unfreezing, in which people are preparing for change; second, moving, in which people have accepted the need for a change and actually engage in the change, and third, refreezing, in which the new change is integrated into the system and becomes part of the new norm or culture. Lewin's (1951) change method theory points out that human behavior is variable among individuals or groups based on their environment at any particular time. Lewin (1951)

focused on social change, pointing out that “group life is never without change, merely difference in amount and time and type of change exist” (p. 199). Lewin’s (1951) field theory proposes maintaining the status quo, or a state of equilibrium, when restraining forces and driving forces balance each other. To achieve change, the restraining forces must be weakened and the driving forces strengthened (Kearney, 2001). Increasing incentives with the use of position power to force change is one approach to increase the driving forces that achieve change (Yukl, 2010). Restraining forces maintain the status quo and resist change. They include norms, values, relations among people, morals, fears, perceived threats, and regulations (Kearney, 2001). Reducing fear or failure, economic loss, or removing opponents reduce restraining forces that create resistance to change (Yukl, 2010). Driving forces support change, and include the desire to please or the desire for new, effective, or efficient activities (Kearney, 2001). System imbalance becomes the impetus for change (Kearney, 2001).

While all these changes in quality improvement and reporting based on compliance with STK measures initially seemed overwhelming, the outcome enhanced the care delivered to stroke patients.

CHAPTER IV

Project Plan

The steps and procedures in the CDC Framework for Program Evaluation have been used for the evaluation of the stroke patient care program (see Appendix C). Program improvement was the focus of the evaluation. Mateo & Kirchhoff's (2009) suggest that program staff is trained to identify disparities between program objectives and the needs of the target population. Also, discrepancies between program implementation and program plans should be identified and addressed. The final disparity that can be identified is one that may exist between the expectations of the target population and the services actually delivered. Identification of three of these discrepancies is vital in order to provide ongoing information to the program.

Setting. This rural hospital provides regional healthcare services to the second largest county in the state (U.S. Census Bureau, 2011b). This rural Nevada is the only hospital in this services area and borders Idaho on the north and Utah on the east. Elko is 300 miles east of Reno, 240 miles west of Salt Lake City, and 250 miles south of Boise.

Population of interest. The population is defined as a collection of patients sharing a common set of universally measured characteristics of ICD-9 CM principle diagnosis of ischemic stroke.

Measures/instruments/activities. The steps in the CDC framework provide a fundamental set of standards of utility, feasibility, propriety, and accuracy for program evaluation (U.S. Department of Health and Human Services,2005). The CDC standards are used in each step of the CDC framework as a guide to keep options of evaluation

manageable by identifying credible evidence that is the most useful (U. S. Department of Health and Human Services, 2005). For a look at evaluation standards, see Appendix E.

Domains of performance include appropriateness, continuity, effectiveness, prevention/early detection, and timeliness. Measurement of related outcomes include: mortality, decreased mortality, readmissions within 30 days, decreased reliability, increased delivery of evidence-based care, and improvement noted as increase in rate.

Timeline.

April 2011

- Defense of capstone proposal
- Revisions to proposal

April – September 2011

- Gather credible evidence: Data collection of stroke core performance measures using a retrospective method for review of the second and third quarters of the year.

October – December 2011

- Justify conclusions: Data analysis, interpretation, and recommendations

January – March 14, 2012

- Ensure use and share lessoned learned
- Completion of program evaluation report

March 29, 2012

- Defend Capstone Project

Resources. The most important component of the program evaluation has been access to data. No funding was necessary for program evaluation completion. As an

employee of the hospital, privilege was granted to participate in the review and the gathering of Stroke Core Performance Measures, which consists of reportable data as part of continuous quality improvement.

IRB approval. In this program evaluation of stroke protocol in a rural hospital, research activities posed no risk to subjects. However, ethical considerations should be deliberated with any research activity involving human -subjects for research. “As the lines between quality improvement activities and research blur, the tendency for these projects to undergo review by IRBs is stronger than in the past” (Zaccagnini & White, 2011, p. 456). The application for Internal Review Board (IRB) approval was completed as required and. This program evaluation received exempt status from the University of Nevada Las Vegas.

Evaluation Plan

Step one: Engage key stakeholders, such as those involved in program operations, those served or affected by the program, and those who are intended users of evaluation findings (U.S. Department of Health and Human Services, 2005). A meeting with stakeholders took place to clarify the intent of the evaluation and a formal letter hospital approval was acquired to evaluate the stroke program (see Appendix G).

Step two: Describe the program with a comprehensive description that clarifies need, targets, potential outcomes, implementation, and resources. (U.S. Department of Health and Human Services, 2005). The methods for sampling, data collection, data analysis, interpretation, and judgment were described. This program evaluation describes program strategies over the third and fourth quarters of 2010, as well as the first, second, and third quarters of 2011, that have been initiated in order to reduce the burden of neurological

disease with the application of a stroke protocol that complies with defined goals for the assessment and management of stroke victims.

Step three: Focus the evaluation design with stakeholders to define the purpose and potential applications of evaluation (U.S. Department of Health and Human Services, 2005). The Application of the Centers of Disease Control (CDC) Framework for Program Evaluation offered a focused approach to answer evaluation questions with the STK measure set that the stakeholders agreed were useful, feasible, ethical, and accurate

Step four: Credible evidence was gathered through the consideration of indicators, sources of evidence/ methods of data collection (U.S. Department of Health and Human Services, 2005). The program evaluator, with the assistance of the hospital's utilization review board, selected patient charts at the end of each quarter based on the ICD code table for stroke diagnoses (See Appendix C). For the purpose of this program evaluation, Starla Ricks MSN, FNP-BC functioned as the program evaluator. The Stroke Core Performance Measures, which consist of Joint Commission & CMS reportable data, were abstracted to determine whether measures have or have not been met. Data abstraction took place following the last day of the previous quarter. Subsequently, all data compiled and interpreted was based on stroke performance measures.

Step 5: Justify conclusions by "analyzing the evidence, making claims about the program based on the analysis, and justifying the claims by comparing the evidence against stakeholder values" (U.S. Department of Health and Human Services, 2005, p.16). Analysis and synthesis of quarterly STK core performance measure findings pre and post protocol detected patterns in evidence.

Step 6: Ensure use of evaluation findings and shared lessons learned in order to improve the program. Relevant recommendations, proper preparation, feedback, follow-ups, and the dissemination of information are all essential components of program applicability (U.S. Department of Health and Human Services, 2005). Perform final evaluation of the program based on data findings. Standards of utility, propriety, and accuracy most directly relate to ensuring use and sharing lessons learned (U.S. Department of Health and Human Services, 2005). The justified evaluation conclusions are based on the evidence including standards, analysis and synthesis, interpretation, judgment, and recommendations.

CHAPTER V

Summary of Implementation/Results

Initiation of the project. The Joint Commission (2010) Specification Manual for Joint Commission National Quality Core Measures defines the population and sampling specifications: The population was defined as a collection of patients sharing a common set of universally measured characteristics that included ICD-9-CM Diagnosis, and the sample size requirements determined the number of cases to sample. In order to achieve a representative sample of the patient population there needs to be a fairly large number of cases to sample. In this rural hospital the average quarterly patient population equaled a patient population size of 7.8 which necessitated collecting data for the entire population.

Threats and barriers to the project. There were challenges faced by this rural hospital that included resistance from the physicians to the changes being implemented. At this rural hospital, physicians referred to the new protocol for STK core performance measure compliance as "cookbook medicine," and argued that adhering to quality guidelines detracted from their ability to use their own judgment and experience. The rural hospital addressed these concerns in several ways, including naming the hospitalist as physician champion to communicate and coordinate the change efforts among physician colleagues. At the same time, physicians and hospital clinical staff received education on the evidence-based research behind the measures and the importance of compliance necessary to ensure that they achieve high standards of care.

Monitoring of the project. The hospital samples were monitored to ensure that sampling procedures consistently produced statistically valid and useful data. Detailed measure specifications, including population identifiers, inclusion and exclusion criteria,

and data element definitions were associated with each of the Stroke (STK) performance measures.

Data collection. Stroke programs should be collecting data for eight of the standardized stroke (STK) measures (Joint Commission, 2010). Data collection includes eight standardized measures on a quarterly basis with the provision that monthly data points are gathered and reported. Data was collected through patient chart abstraction using ICD code tables of stroke measures. This program evaluation includes retrospective data sources for administrative data and medical records.

The measure set is applicable to patients with diagnosis of ischemic stroke. The numerator within the stroke performance measure is the number of stroke patients that receive treatment within the guidelines of the stroke performance measure. The denominator is the number of stroke patients in total. Exclusions to the population include patients younger than 18 years of age, patients who left against medical advice, patients who expired, and patients admitted for the performance of elective carotid intervention.

- **STK-1: Venous Thromboembolism (VTE) Prophylaxis**

Numerator: Ischemic or hemorrhagic stroke patients who received VTE prophylaxis or have documentation why no VTE prophylaxis was given on the day of or the day after hospital admission

Denominator: Ischemic stroke patients

- **STK-2: Discharged on Antithrombotic Therapy**

Numerator: Ischemic stroke patients prescribed antithrombotic therapy at hospital discharge

Denominator: Ischemic stroke patients

- **STK-3: Anticoagulation Therapy for Atrial Fibrillation/Flutter**

Numerator: Ischemic stroke patients prescribed anticoagulation therapy at hospital discharge

Denominator: Ischemic stroke patients with documented atrial fibrillation/flutter

- **STK-4: Thrombolytic Therapy**

Numerator: Acute ischemic stroke patients for whom thrombolytic therapy was initiated at this hospital within 3 hours (< 180 minutes) of identification signs of stroke

Denominator: Acute ischemic stroke patients whose time of arrival is within 2 hours (< 120 minutes) of identification signs of stroke

- **STK-5: Antithrombotic Therapy by End of Hospital Day 2**

Numerator: Ischemic stroke patients who had antithrombotic therapy administered by end of hospital day 2

Denominator: Ischemic stroke patients

- **STK-6: Discharged on Statin Medication**

Numerator: Ischemic stroke patients prescribed statin medication at hospital discharge

Denominator: Ischemic stroke patients with an LDL > 100 mg/dL, OR LDL not measured, OR who were on a lipid-lowering medication prior to hospital arrival

- **STK-8: Stroke Education**

Numerator: Ischemic or hemorrhagic stroke patients with documentation that they or their caregivers were given educational material addressing all of the following:

1. Activation of emergency medical system

2. Need for follow-up after discharge
3. Medications prescribed at discharge
4. Risk factors for stroke
5. Warning signs for stroke

Denominator: Ischemic stroke patients discharged home

- **STK-10: Assessed for Rehabilitation**

Numerator: Ischemic or hemorrhagic stroke patients assessed for, or who received rehabilitation services

Denominator: Ischemic stroke patients

Data analysis. Data was analyzed using the statistical package for the social sciences (SPSS). Data analysis included log-linear regression of one hundred percent of the quarterly initial patient population of ischemic stroke cases.

To assess whether the stroke protocol was significant in increasing the number of correctly diagnosed patients, a log-linear regression analysis was conducted. Combining the two pre-protocol quarters data (3rd and 4th quarters of 2010) and comparing that to the three post-protocol quarters data (1st, 2nd, and 3rd quarters of 2011), the interaction between pre and post-protocol diagnoses was significant, $Z = 3.28$, $p = .001$. The parameter estimate (.429) indicated an odds ratio of 1.54 which can be interpreted as 54% increase, or, in other words, patients were 54% more likely to be diagnosed correctly after the stroke protocol was implemented. Further assessment of the individual STK measures showed that four of the eight measures (STK 7 and STK 9 were not used in this evaluation) significantly differed from pre-protocol to post-protocol: a binomial test

indicated that STK 1 (p = <.0005), STK 2 (p = <.0005), STK 6 (p = <.0005), and STK 8 (p = <.0005) all significantly increased at an alpha level of p = .025 (one tailed test).

Table 1 *Results*

STK Measure	Diagnosed/Total (Pre-protocol)	% Diagnosed (Pre-protocol)	Diagnosed/Total (Post-protocol)	% Diagnosed (Post-protocol)
1	3/7	43%	15/16	94%
2	7/8	88%	13/13	100%
3	1/1	100%	2/2	100%
4	0/1	0%	0/1	0%
5	6/7	86%	13/14	93%
6	1/3	33%	6/6	100%
8	1/6	17%	5/8	63%
10	8/8	100%	14/14	100%

Giving Meaning to the Data

Log-linear regression is used for assessing relationships where the dependent variable is dichotomous. Logistic regression is useful when at least one of the independent variables is continuous whereas log-linear regression is typically used when both the independent and dependent variables are dichotomous. The individual comparisons of the STK measures were limited sample sizes and the outcome was dichotomous. It was not

possible to do a repeated measures t-test. The binomial test uses a binomial distribution and is useful for comparing two proportions or counts, which is applicable to this study. To see if the percentages were significantly different the binomial test compared the number of patients who were diagnosed correctly vs. incorrectly to the proportion of successes prior to the protocol. Suggestions to further examine the individual protocols would be to collect more data so that one could at least use a normal approximation rather than the binomial distribution to assess differences.

Descriptive statistics were used to describe sample characteristics and frequencies including gender, age, and Ferri's (2011) risk factors for ischemic stroke including diabetes mellitus, hypertension, smoking, family history of premature vascular disease, hyperlipidemia, atrial fibrillation, history of TIA, history of recent myocardial infarction, and history of congestive heart failure. Descriptive statistical findings were as such: 14 males, 25 females, ages 44 years-of-age to 92 years-of-age, 12.8% of the patients had diabetes mellitus, 25% of the patients had hypertension, 7% of the patients smoked or had a history of tobacco use, 5% of the patients had a history of recent myocardial infarction, and 23% had a history of congestive heart failure.

Dissemination and Utilization of Results

The goal for dissemination is to achieve full disclosure and impartial reporting that ensures that the stakeholders are aware of the evaluation procedures and findings (CDC, 1999) An essential step in program evaluation is writing an evaluation plan and disseminating the report is to stakeholders (Mateo & Kirchoff, 2009). A plan to provide a program evaluation report of the results of the project has been discussed and agreed upon with the stakeholders. The program evaluation report ensures that the information

needs of relevant audiences will be met. Mateo and Kirchoff (2009) describe the 10 components of the program evaluation report which will include the purpose of the report; the nature of the clinical program and its components parts; the setting of the program; the time frame for the program; the program staff resources used; the way the data obtained during the formative evaluation were used to alter the program and improve its implementation process; the evaluation methods used, including the evaluation of the program process and outcome variables; results of data analysis; recommendations for program revisions, refinement, and continuation; and a summary of the program's overall effectiveness in achieving its designed purpose.

By applying the principles of the CDC framework into the program evaluation of stroke protocol in a rural Nevada hospital both the procedures used and the lessons learned from the evaluation can be utilized as a driving force for improving the existing stroke care and account for health promotion and disease intervention. The stroke protocol was significant in increasing the number of correctly diagnosed patients and assessment of the individual STK measures showed that four of the eight measures significantly differed from pre-protocol to post-protocol.

The systematic use of this stroke protocol supported the use of evidence-based practice guidelines and improved compliance with standards. The stroke protocol must be kept current to incorporate subsequent scientific evidence. Given this research perspective, the program evaluation, with a population perspective and ensuing data analysis, serves to provide further relevant data engaged in the pursuit of lessening this health care disparity.

APPENDIX A

DEFINITION OF TERMS

PROGRAM EVALUATION DEFINITIONS

U.S. Department of Health and Human Services, 2005

Program evaluation: The systematic collection of information about the activities, characteristics, and outcomes of programs to make judgments about the program, improve program effectiveness, and/or inform decisions about future program development.

Stakeholders: People or organizations that are invested in the program or that are interested in the results of the evaluation. Stakeholders include organizations, hospitals, clinical professionals, and, health care consumers

Standards: A principle commonly agreed upon by experts in the conduct and use of an evaluation for the measure of the value or quality of an evaluation (e.g., accuracy, feasibility, propriety, utility).

Accuracy: The extent to which an evaluation is truthful or valid in what it says about a program, project, or material.

Feasibility: Planned evaluation activities realistic given the time, resources, and expertise at hand.

Propriety: The extent to which the evaluation has been conducted in a manner that evidences uncompromising adherence to the highest principles and ideals (including professional ethics, civil law, moral code, and contractual agreements).

Utility: The extent to which an evaluation produces and disseminates reports that inform relevant audiences and have beneficial impact on their work.

STROKE DEFINITIONS

McCance and Huether, 2009

Ischemic Stroke: result when an artery to the brain is block, often by a blood clot or a fatty deposit due atherosclerosis.

Thrombotic Stroke: arterial occlusions caused by thrombi formed in the arteries supplying the brain or intracranial vessels.

Transient Ischemic attacks: thrombotic particles causing an intermittent blockage of circulation or spasm.

Embolic Stroke: involves fragments that break from a thrombus formed outside the brain or in the heart, aorta, common carotid, or thorax.

The Joint Commission, 2010 Core Performance Measure: one common set of measure specifications. The goal is to minimize data collection efforts for these common measures and focus efforts on the use of data to improve the health care delivery process**.**

Center for Disease Control and Prevention, 2011 The International Classification of Diseases (ICD): is designed to promote international comparability in the collection, processing, classification, and presentation of mortality statistics.

APPENDIX B

STK CORE MEASURES

Stroke (STK) Core Measure Set

STK-1	Venous Thromboembolism (VTE) Prophylaxis@
STK-2	Discharged on Antithrombotic Therapy@
STK-3	Anticoagulation Therapy for Atrial Fibrillation/Flutter@
STK-4	Thrombolytic Therapy@
STK-5	Antithrombotic Therapy By End of Hospital Day 2@
STK-6	Discharged on Statin Medication@
STK-8	Stroke Education@
STK-10	Assessed for Rehabilitation@

@ denotes Accountability evaluation pending

APPENDIX C

ICD 9 CODES

Joint Commission International

Appendix A

ICD Code Tables
Stroke Measures

Please Note : Due to the various ICD Code versions used by different countries, ICD-8, ICD-9, and ICD-10 spaces have been left intentionally blank. Please fill in the specific code utilized by your country to correspond to the ICD-9-CM code description for the following diagnoses.

Table 8.1
Ischemic Stroke (STK)

ICD-8 Code	ICD-9 Code	ICD-10 Code	ICD-9-CM Code	Shortened Description
			433.01	OCL BSLR ART W INFRCT
			433.10	OCL CRTD ART WO INFRCT
			433.11	OCL CRTD ART W INFRCT
			433.21	OCL VRTB ART W INFRCT
			433.31	OCL MLT BI ART W INFRCT
			433.81	OCL SPCF ART W INFRCT
			433.91	OCL ART NOS W INFRCT
			434.00	CRBL THRMBS WO INFRCT
			434.01	CRBL THRMBS W INFRCT
			434.11	CRBL EMBLSM W INFRCT
			434.91	CRBL ART OCL NOS W INFRC
			436	CVA

Table 8.2
Hemorrhagic Stroke (STK)

ICD-8 Code	ICD-9 Code	ICD-10 Code	ICD-9-CM Code	Shortened Description
			430	SUBARACHNOID HEMORRHAGE
			431	INTRACEREBRAL HEMORRHAGE

APPENDIX D

STROKE PROTOCOL

(Attached pages)

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Protocol for Stroke Patients

Contents:

- Acute Ischemic Stoke Time Windows
- NIH Stroke Scale (NIH Worksheet)
- Alteplase standing orders for ED
- tPA inclusion and exclusion criteria (Alteplase Criteria)
- Ischemic stroke and TIA CareMap
- In Patient standing orders for CVA and TIA
- ICH Guidelines
- Glossary

Protocol:

Patients who present in the Emergency Department with any or all of the following symptoms will be assessed for acute ischemic stroke, surgical or non-surgical intracranial hemorrhage:

A. Alteration in consciousness
   1. Stupor or coma
   2. Confusion or agitation
   3. Seizures

B. Aphasia or other higher cognitive disturbance

C. Dysarthria

D. Facial weakness or asymmetry (ipsilateral or contralateral to limb weakness)

E. Incoordination, weakness, paralysis, or sensory loss of one or more limbs (usually one half of the body)

F. Ataxia, poor balance, clumsiness, or difficulty walking

G. Visual loss
   1. Monocular or binocular
   2. May be partial loss of the field

H. Vertigo, double vision, unilateral hearing loss, nausea, vomiting, headache, photophobia, or phonophobia

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Procedure:

1. The ED physician will assess the patient upon arrival to the Emergency Department.

2. STAT CT Scan

3. STAT blood draw for :
    a. CBC with platelet count
    b. PT and a PTT
    c. CMP
    d. Glucose
    e. Crossmatch on demand
    f. STAT EKG

4. IV access X3: 18 gauge preferred. NS or 0.45 NS keep open at 50cc/hr. Do not D/C existing IV lines. Saline lock if necessary.

5. Complete vital signs once, then blood pressure every 15 min

6. No heparin, warfarin, or aspirin

7. Following initial assessment by ED physician and nurse, the ED physician will determine the need to activate the stroke response system. Page the Stroke Team at 775-982-4144.

8. The Stroke Team will be provided with the following information:
    a. Time of symptoms onset
    b. NIH Stroke Scale Score
    c. CT scan of head w/o contrast results
    d. General description of patient condition, stroke risk factors

9. If patient is a tPA candidate have the patients' weight available.

10. Obtain "old charts" after patient's previous medical record number is determined.

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Acute Ischemic Stroke – Treatment Time Windows

IV tPA	3 hours	NIHSS 4-20
IA tPA or Urokinase	6 hours	NIHSS >10
Merci Clot Retrieval	8 hours	NIHSS >10

NOTE: Dr Katz or stroke team may extend windows based on consultation with ED physician.

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

NIH Worksheet/ NIH stroke Scale
Page One

	Category	Scale	Response
1.A	**Level of Consciousness** (alert, drowsy, stuperous, coma)	0 1 2 3	= Alert = Drowsy = Stuporous = Coma
1.B	**LOC Questions** (current month, age)	0 1 2	= Answers both correct = Answers one correct = Incorrect
1.C	**Commands** (open-close eyes, make fist, let go)	0 1 2	= Obeys both correct = Obeys one correct = Incorrect
2.	**Best Gaze** (voluntary or reflex) (eyes open-pt follows examiner finger or face)	0 1 2	= Normal = Partial gaze palsy = Total gaze palsy
3.	**Visual Fields** (Introduce visual stimulus/threat to pt's visual field quadrants. Double simultaneous stimulation is performed at this point and results are used in item 11)	0 1 2 3	= No visual loss = Partial hemianopia = complete hemianopia = bilateral hemianopia (blind)
4.	**Facial Palsy** (show teeth raise eyebrow & squeeze eyes shut)	0 1 2 3	= Normal symmetrical movement = Minor paralysis = Partial paralysis = Complete paralysis
5.A.	**Motor Arm-Left** (elevate extremity to 90 degrees & score drift/movement)	0 1 2 3 4 9	= No downward drift before 10 sec. = Drift = Some effort against gravity = No effort against gravity = No movement = Amputation, joint fusion (explain)
5.B.	**Motor Arm- Right** (elevate extremity to 90 degree & score drift/movement)	0 1 2 3 4 9	= No downward drift before 10 sec. = Drift = Some effort against gravity = No effort against gravity = No movement = Amputation, joint fusion (explain)

Subtotal_____

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

NIH Worksheet/ NIH stroke Scale
Page Two

	Category	Scale	Response
6.A	**Motor Leg-Left** (elevate extremity to 30 degrees & score drift/ movement)	0 1 2 3 4 9	= No downward drift before 10 sec. = Drift = Some effort against gravity = No effort against gravity = No movement = Amputation, joint fusion (explain)
6.B	**Motor Leg-Right** (elevate extremity to 30 degrees & score drift/ movement)	0 1 2 3 4 9	= No downward drift before 10 sec. = Drift = Some effort against gravity = No effort against gravity = No movement = Amputation, joint fusion (explain)
7.	**Limb Ataxia** (finger-nose, heel down shin)	0 1 2	= Absent = One limb = Two limb
8.	**Sensation** (pin prick to face, arm, trunk & leg compare side to side)	0 1 2	= Normal = Mild Loss = Severe or total loss
9.	**Language** (reading, naming, describing picture)	0 1 2 3	= Normal = Mild aphasia = Severe aphasia = Mute or global aphasia
10.	**Dysarthria** (evaluate speech clarity by patient repeating listed words)	0 1 2 9	= Normal articulation = Mild to moderate dysarthria = Severe dysarthria = Intubated or other physical barrier
11.	**Extinction & Inattention** (use information from prior testing see item 3)	0 1 2	= No neglect = Partial inattention (mild neglect) = Profound hemi-inattention (severe)

Subtotal (page1) _____
Subtotal (page 2) _____ Total (NIH Score) _____

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Emergency Department Standing Orders for Alteplase (tPA) For Stroke

1. **Admit to** ICU ____ MSP Telemetry_____ or Transfer _____
2. **Activity**:_____
3. **Diet:** _____
4. **Monitoring**: BP and Neurologic signs Q 15 minutes X 2 hours, then Q 30 minutes X 6 hours, then Q 60 minutes X 30 hours.
5. **Laboratory**: CBC with Differential, PT and PTT, Blood Glucose, Crossmatch on Demand.
6. **Non-Contrast** CT head Scan Interpreted by Radiologist
7. **Thrombolytic Treatment** must be started within 180 minutes to 4.5 hours from the onset of the stroke.
8. **No Heparin or Antiplatelet drugs** for 24 hours. If Heparin is ordered 24 hours after Alteplase, start infusion **without bolus loading** dose.
9. **IV lines** X3, may include existing IV's. 18 gauge preferred, but **do not** D/C existing IV. One for tPA, one for blood draws, and one for possible blood transfusion (s). May saline lock pre-hospital IV

ADMINISTATION OF ALTEPLASE:

1. **Alteplase (tPA).** Choose the smaller of the following:
   A. Maximum total dose, for patients greater than 100kg is 90 mg = 9 mg Bolus over 1 minute + 81mg VI infusion over 60 minutes.
   B. Patient weight =_____kg X0.9 mg/kg = _____mg Total Dose
      Give 10%=_____mg IV over one minute
      Give 90%=_____mg Infusion over 60 minutes
2. **Monitor** arterial blood pressure during the first 24 hours after starting treatment. ! 15 minute for 2 hours after starting infusion, then Q 30 minute for 6 hours, then Q1 hour until 30 hours after staring treatment.

GUIDELINES FOR THERAPY:

1. If Systolic BP is >230 mmHg or Diastolic BP >140 mmHg on 2 readings 5 minutes apart, start NITROPRUSSIDE. (50mg in 250 cc; Titrate to Effect)
2. If Systolic BP is 180-230 mmHg, Diastolic BP 105-140 mmHg, or MAP > 130 mmHg on 2 readings 20 minutes apart, START
   A. _____LABETALOL 10-20 mg Slow IVP. May repeat Q 10 min w/ 20-40mg PRN. Max dose=150mg IV.
   B. _____ENALAPRIL 1.25mg Slow IVP. May repeat 1.25-2.5mg in 30 min PRN. Max dose=20mg IV/24 hours
   C. _____METOPROLOL 5mg Slow IVP. May repeat Q 10 minutes X3 Doses PRN.
   D. _____CLONIDINE 0.1mg Sublingual now. May repeat in 30 minute PRN.
   E. _____ESMOLOL 500mcg/Kg IVP over 1 minute, then infuse 100 mcg/kg/min. (Approx. 40mg/hr of 2.5 gM in 250cc)
   F. _____VERAPAMIL IV 5mg IVP over 2 minutes. May repeat 5-10 mg in 30 min. PRN

If systolic BP is <180 mmHg and Diastolic BP <105 mmHg defer Antihypertensive Therapy. Choice of medication depends on other medical contraindications.

***No NG, Foley, Blood draws, IV, or Invasive lines X 24 hours**

Intracranial Hemorrhage (ICH) management guidelines:

1. Stop tPA if clinical suspicion of ICH (Neuro Deficit, Neuro H A, HTN, N/V)
2. STAT Head CT without contrast
3. STAT Labs: PT, PTT. Platelets, Crossmatch on Demand.
4. Administer 6-8 units of Cryoprecipitate, Fibrinogen, Factor VII and 6-8 Units of Platelets.

_____
MD Signature

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Alteplase Criteria

Alteplase (tPA) Checklist for use in Brain Infarct

INCLUSIONS:

TO BE ELIGIBLE TO RECEIVE Tpa, PATIENT MUST METT INCLUSIONS CRITERIA LISTED BELOW:

1. Clinical diagnosis of Ischemic stroke causing a measurable neurologic deficit presumed to be due to cerebral ischemia.
2. Negative head CT for Intracranial hemorrhage.
3. Age 18 years or >

EXCLUSIONS:

TO BE ELIGIBLE TO RECEIVE tPA, PATIENT MUST NOT MEET ANY OF THE EXCLUSION CRITERIA LISTED BELOW:

ACTUAL BLEED/CURRENT CLINICAL CONDITION:

1. Evidence of Intracranial hemorrhage on CT scan.
2. Clinical presentation suggesting subarachnoid hemorrhage, even w/ normal CT scan (see glossary for clinical signs and symptoms)
3. Hypodensity or mass effect suggestive of evolving infarction on CT scan.
4. Active internal bleeding
5. Minor symptoms or rapidly improving stroke symptoms.
6. Seizure at time of onset of stroke symptoms.
7. Coma.
8. NIH Stroke Scale > 20

METABOLIC/MEDICATION:

1. Platelet count <100,000 (result required).
2. History of being on Heparin w/in 24 hours and elevated PTT
3. Currently taking Low Molecular Weight Heparin
4. If on coumadin with an INR>1.7
5. Persistent systolic BP > 185 mmHg or Diastolic BP>110 mmHg at time treatment is to begin>
6. Overly aggressive treatment required to reduce blood pressure.
7. Blood glucose < 50 mg/dl or >400 mg/dl (results required).

HISTORY OF BLEED/ COMPLICATING CONDITION

1. Major surgery or trauma in the previous 14 days.
2. Significant head trauma w/in the previous 3 months.
3. History of GI or GU hemorrhage in the previous 21 days.
4. Recent arterial puncture at the noncompressible site.
5. Lumbar puncture within the previous 7 days.
6. History of Intracranial hemorrhage considered to put the individual at an increased risk or recurrent Intracranial hemorrhage.
7. History of stroke w/in the previous 3 months.
8. Known arteriovenous malformation or aneurysm.
9. Lactating female or suspected pregnancy.
10. Acute MI---requires cardiology consultation
11. Post Myocardial infarction pericarditis.
12. Subacute bacterial endocarditis.

Eligible for Thrombolysis?

YES / NO
(Circle one)

_____
MD Signature

Patient Sticker

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Stroke and TIA Care Map

Day 1	CT Scan on Admission, EKG, CXR CBC, CMP, PT/PTT, ESR Admit to critical care if thrombolytic therapy initiated, otherwise admit to monitored bed for 24 hours Working Diagnosis --- Estimation of Functional Outcome TEE Therapy Evaluation --- PT, Speech Case Manager --- Begin Discharge Planning
Day 2	Results of above reviewed, treatment plan initiated. If Diagnosis is uncertain or previous day test indicate further invasive workup, the following options may be utilized: MRI/MRA Angiography obtained within 24 hours Further Hematologic or Serologic workup instituted. By this time Therapy Evaluation should be completed and rehab treatment plan should be initiated.
Day 3	At this point definitive diagnosis in terms of etiology of stroke should be apparent and medical treatment or surgical procedure should be underway or planned. Patients with TIA or uncomplicated stroke should be ready for either discharge or Rehab/SNF transfer.

Please note: This protocol is only a guide to the workup and treatment of patients with uncomplicated Stroke. Due to the severity or unusual etiology of stroke in certain individuals it is likely that hospital days may be prolonged.

In Patient Standing Orders

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Ischemic Stroke (Acute CVA) and TIA

1. Admit To: MSP Telemetry _____ ICU____
   Admitting MD:_____
   Diagnosis:_____
   Condition:_____
   Allergies:_____

2. Rehab Consult
   _____Speech _____PT

3. Radiology Studies
   _____Carotid Doppler Studies _____TEE

4. Labs: In the AM
   ___CBC
   ___Lipids
   ___BMP
   ___Other _____

5. Vital Signs Q2 hours with Neuro checks X 4 then per MSP/ICU Protocol
6. I&O's Daily
7. Oxygen: NC to maintain SA02 > 90%

8. Diet:
   ___NPO (including meds) bedside swallow eval. By Speech Pathology/Nurse
   ___Dysphagia I (pureed solids with thick liquids)
   ___Dysphagia II (mechanical soft solids with thick liquids)

9. Activity:
   ___Bed Rest ___HOB elevated 30 degrees ___BRP
   ___Chair ___up with assistance ___up ad lib

10. IV Fluids:
    ___0.9% NaCL at _____cc/hr____add_____Meq Kcl
    ___Other_____

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

11. Medications:
____Enteric Coated Aspirin (Ecotrin) 325 mg PO daily
If unable to swallow Enteric coated Aspirin, Aspirin 325 mg supp PR daily
____Plavix 75 mg PO Daily
____Weight based heparin protocol
____Lovenox (1mg/Kg) SQ
____Coumadin
____Acetaminophen (Tylenol) 650 mg PO or PR Q 4 hours. PRN Temp > 99 or pain
____Docusate sodium (Colace) 100mg PO BID
____Statins
____Other_____

12. Blood Pressure Management:
Treat SBP>_____or
DBP>_____with_____
_____
_____
Call MD for SBP >_____or DBP>_____
13. _____Sequential Compression Stockings
_____TED hose
14. Foley Catheter to gravity drainage
15. Other
Orders:_____
_
_____

Date:_____/____/_____ Time: _____

_____
Physician's Signature

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Guidelines for Management of Intracranial Hemorrhage

CT Reports Must Specify: Location
Size of Hematoma in cc
Presence or Absence of Ventriculomegaly
Mass Effect
CT Evidence of Herniation

Blood Pressure management in ICH---- Critical Care medicine Consultation

Suggested Medications:

Labetalol	5-100 mg/hr by intermittent bolus dose of 10-40 mg or continuous drip (228 mg/min)
Esmolol	500 mcg/Kg as a load; maintenance use, 50-200 mcg/Kg/min
Nitroprusside	0.5 mcg/Kg/min (Nitroprusside is a vasodilatory agent that theoretically can increase cerebral blood flow and thereby Intracranial pressure)
Hydralazine	10-20 mg Q4-6 hours
Enalapril	0.625-1.2 mg Q6h PRN

Guidelines for Therapy:

1. If Systolic BP is >230 mmHg or diastolic BP >140 mmHg on 2 readings, 5 minutes apart, institute Nitroprusside.

2. If Systolic BP is 180-230 mmHg, diastolic BP 105-140 mmHg, or MAP>130 mmHg on 2 readings 20 min apart, institute IV Labetalol, Esmolol, Enalapril, or other smaller doses of easily tritratable IV med such as Diltiazam, Lisinopril, or Verapamil.

3. IF Systolic BP is <180 mmHg and Diastolic BP <105 mmHg, defer antihypertensive therapy. Choice of medication depends on other medical contraindications (eg. Avoid giving Labetalol in patients with Asthma)

4. If ICP monitoring is available, cerebral perfusion pressure should be kept at >70mmHg

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Management of Hypotension:

Volume Replacement:	Isotonic Saline or Colloids CVP or Pulm Artery Wedge Pressure Monitoring

If Hypotension persists after volume replacement and systolic BP is < 90 mmHg:

Neosynephrine	20mg/250cc NS titrate to effect
Dopamine	2-20 mcg/Kg/min
Norepinephrine	Titrate from 0.05 – 0.2 mcg/Kg/min

NORTHEASTERN NEVADA REGIONAL HOSPITAL
NEUROLOGICALLY COMPRISED PATIENT (NON-TRAUMA)
Ischemic Stroke Patients (Acute CVA)

Glossary of Terms

- Aphasia – Loss or impairment of the power to use or comprehend words.
- Ataxia – Inability to coordinate voluntary muscular movements
- Binocular – Use of both eyes
- Contralateral – Occurring on, affecting, or acting in conjunction with a part on the opposite side of the body
- Dysarthria – Difficulty in articulating words
- Dysphagia – Difficulty swallowing
- Dysphasia – Loss or deficiency in the power to use or understand language
- Hemianopia – Blindness in one half of the visual field or one or both eyes
- Ipsilateral – Situated or appearing on or affecting the same side of the body
- Phonophobia – Pathological fear of sound or of speaking aloud
- Photophobia – intolerance to light
- Monocular – involving or affecting a single eye
- Stuporous – dazed or insensible state

Signs and Symptoms of Subarachnoid Hemorrhage:

1. Severe Headache
2. Sudden or decreased consciousness and alertness
3. Nausea/ Vomiting
4. Dizziness
5. Brief LOC
6. Facial or eye pain
7. Vision problems, including double vision, blind spots, or temporary vision loss in one eye
8. Eye pupils different sizes
9. Increase in Sleepiness
10. Mood and personality changes, including confusion and irritability
11. Photophobia
12. Seizure

rt-PA (Activase/Alteplase) Dose Calculation for Treatment of Acute Stroke

NOTE: DO NOT SUBSTITUTE ANY OTHER THROMBOLYTIC FOR Activase/Alteplase OR USE ANY OTHER DOSING CRITERIA WHEN ADMINISTERING rt-PA THERAPY FOR STROKE.

Total Dose = 0.9 mg/kg x weight in kg; maximum dose 90mg.

Give 10% of Total Dose as IV bolus over 1-2 minutes

Give remaining 90% of Total Dose over 1 hour via IV infusion pump

Patient Weight		Total Dose	Discard from Vial	Bolus Dose	Infusion Dose		Patient Weight		Total Dose	Discard from Vial	Bolus Dose	Infusion Dose
Lbs	Kg	mg=ml	mg=ml	mg=ml	mg=ml		Lbs	Kg	mg=ml	mg=ml	mg=ml	mg=ml
90	40.9	36.8	63.2	3.7	33.1		156	70.9	63.8	36.2	6.4	57.4
92	41.8	37.6	62.4	3.8	33.8		158	71.8	64.6	35.4	6.5	58.1
94	42.7	38.4	61.6	3.8	34.6		160	72.7	65.4	34.6	6.5	58.9
96	43.6	39.2	60.8	3.9	35.3		162	73.6	66.2	33.8	6.6	59.6
98	44.6	40.1	59.9	4.0	36.1		164	74.6	67.1	32.9	6.7	60.4
100	45.5	41.0	59.0	4.1	36.9		166	75.5	68.0	32.0	6.8	61.2
102	46.4	41.8	58.2	4.2	37.6		168	76.4	68.8	31.2	6.9	61.9
104	47.3	42.6	57.4	4.3	38.3		170	77.3	69.6	30.4	7.0	62.6
106	48.2	43.4	56.6	4.3	39.1		172	78.2	70.4	29.6	7.0	63.4
108	49.1	44.2	55.8	4.4	39.8		174	79.1	71.2	28.8	7.1	64.1
110	50.0	45.0	55.0	4.5	40.5		176	80.0	72.0	28.0	7.2	64.8
112	50.9	45.8	54.2	4.6	41.2		178	80.9	72.8	27.2	7.3	65.5
114	51.8	46.6	53.4	4.7	41.9		180	81.8	73.6	26.4	7.4	66.2
116	52.7	47.4	52.6	4.7	42.7		182	82.7	74.4	25.6	7.4	67.0
118	53.6	48.2	51.8	4.8	43.4		184	83.6	75.2	24.8	7.5	67.7
120	54.6	49.1	50.9	4.9	44.2		186	84.6	76.1	23.9	7.6	68.5
122	55.5	50.0	50.0	5.0	45.0		188	85.5	77.0	23.0	7.7	69.3
124	56.4	50.8	49.2	5.1	45.7		190	86.4	77.8	22.2	7.8	70.0
126	57.3	51.6	48.4	5.2	46.4		192	87.3	78.6	21.4	7.9	70.7
128	58.2	52.4	47.6	5.2	47.2		194	88.2	79.4	20.6	7.9	71.5
130	59.1	53.2	46.8	5.3	47.9		196	89.1	80.2	19.8	8.0	72.2
132	60.0	54.0	46.0	5.4	48.6		198	90.0	81.0	19.0	8.1	72.9
134	60.9	54.8	45.2	5.5	49.3		200	90.0	81.8	18.2	8.2	73.6
136	61.8	55.6	44.4	5.6	50.0		202	91.8	82.6	17.4	8.3	74.3
138	62.7	56.4	43.6	5.6	50.8		204	92.7	83.4	16.6	8.3	75.1
140	63.6	57.2	42.8	5.7	51.5		206	93.6	84.2	15.8	8.4	75.8
142	64.6	58.1	41.9	5.8	52.3		208	94.6	85.1	14.9	8.5	76.6
144	65.5	59.0	41.0	5.9	53.1		210	95.5	86.0	14.0	8.6	77.4
146	66.4	59.8	40.2	6.0	53.8		212	96.4	86.8	13.2	8.7	78.1
148	67.3	60.6	39.4	6.1	54.5		214	97.3	87.6	12.4	8.8	78.8
150	68.2	61.4	38.6	6.1	55.3		216	98.2	88.4	11.6	8.8	79.6
152	69.1	62.2	37.8	6.2	56.0		218	99.1	89.2	10.8	8.9	80.3
154	70.0	63.0	37.0	6.3	56.7		220+	100.0	90.0	10.0	9.0	81.0

Alteplase, tPA

(Activase)

Accelerated intravenous infusion for AMI:

(do not confuse with CVA protocol)

Have 2 IV lines in place before administration

Adults: >= 67kg/147.4 lbs

15mg IV bolus over 2 min
50mg IV infusion over 30 min (100cc/hr to infuse 50cc/50mg)
35mg IV infusion over 60 min (35cc/hr to infuse 35mg)

Adults: < 67kg/147.4 lbs

15mg IV bolus over 2 min
0.75 mg/kg over 30 min (not to exceed 50mg)
0.5 mg/kg over 60 min (not to exceed 35mg)

Lbs	kg	0.75 mg/kg over 30 min	0.5 mg/kg over 60 min
100	45.5	34mg (68cc/hr)	23 mg (23cc/hr)
110	50	37.5 mg (75cc/hr)	25 mg (25cc/hr)
120	54.5	40.8 mg (82cc/hr)	27 mg (27cc/hr)
130	59	44 mg (88cc/hr)	30 mg (30cc/hr)
140	63.6	47.7 mg (95cc/hr)	32 mg (32cc/hr)
145	66	49.5 mg (99cc/hr)	33 mg (33cc/hr)

100mg vial:

Mix with sterile water provided.
Swirl, don't shake.
Gently extract medication for IV bolus
Spike vial with vented tubing.

50mg vial:

Mix with sterile water provided.
Swirl, don't shake.
Gently extract medication from vial and place in IV bag provided.
Remember to keep out 15mg for IV bolus.

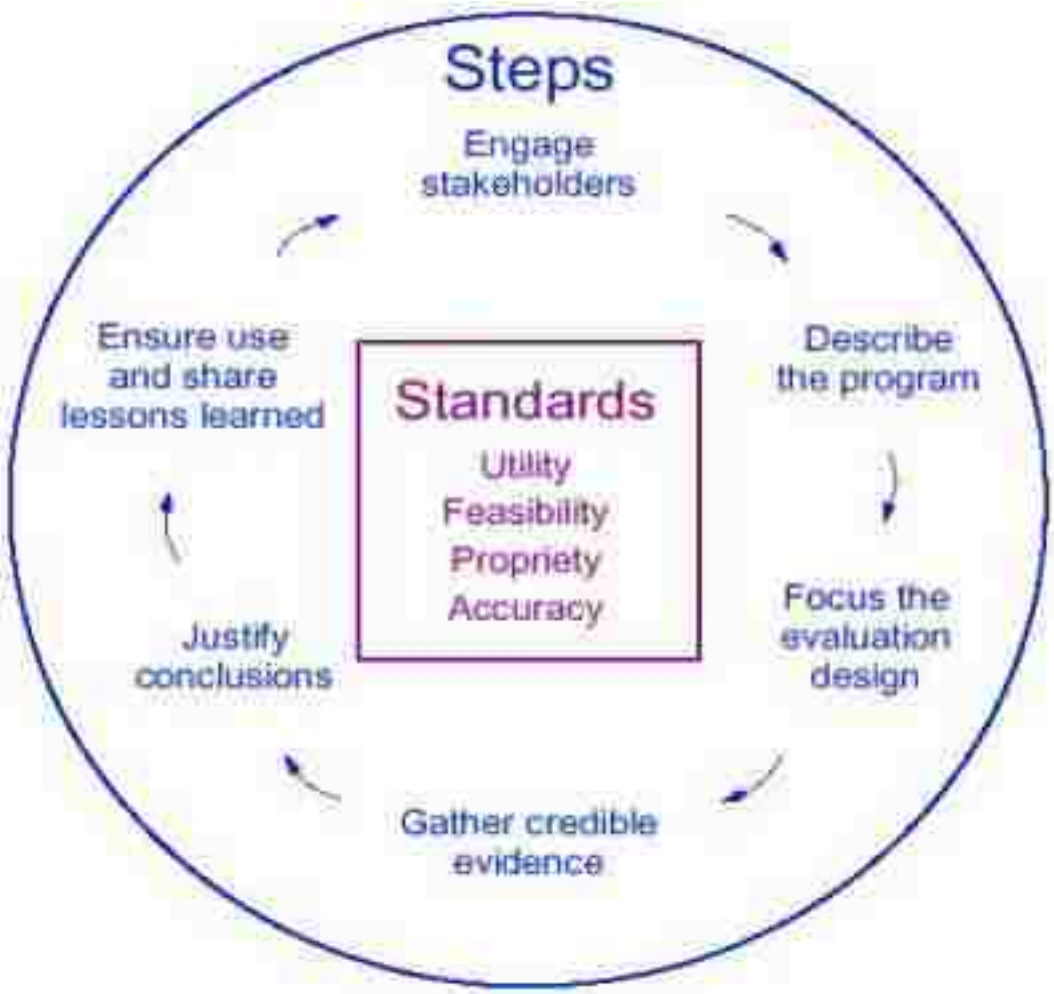
(Mix two 50mg vials)

Both are mixed 1:1

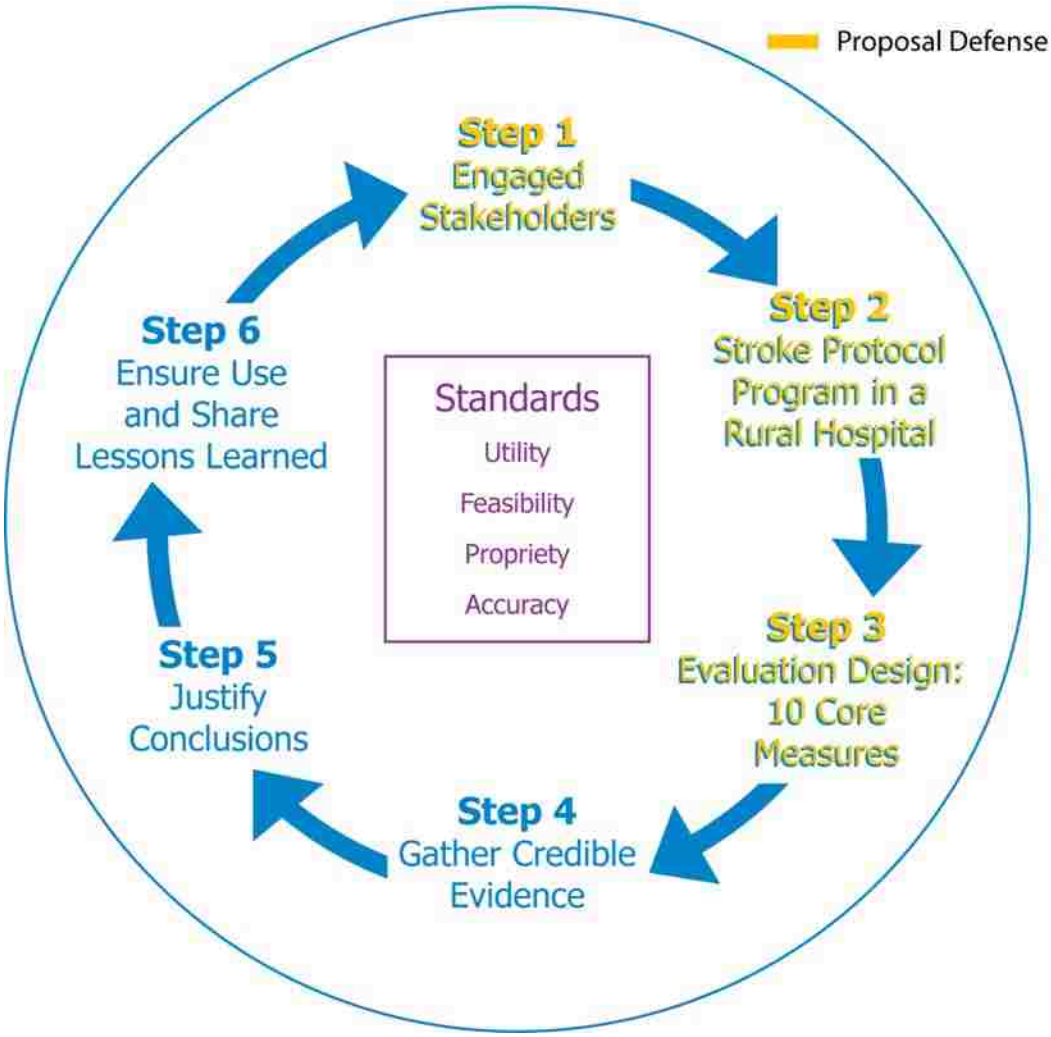
Monitor neurological status

APPENDIX E

CDC FRAMEWORKS



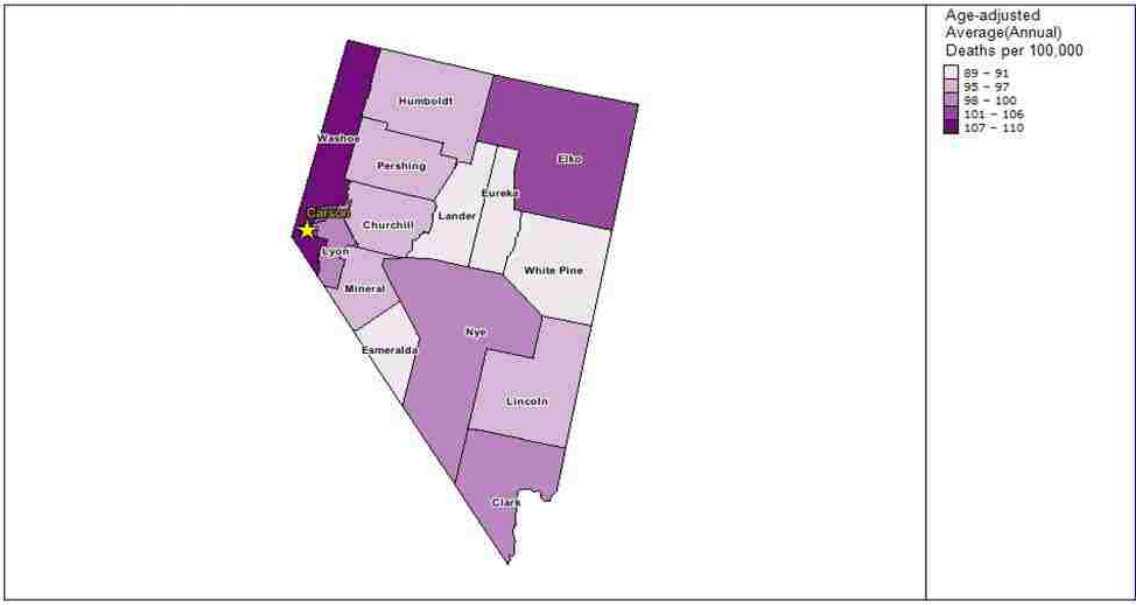
Framework for Program Evaluation:
Stroke Protocol in a Rural Nevada Hospital



APPENDIX F

STROKE MAPS

Nevada — Stroke Death Rates
Total Population, Ages 35+, 2000 – 2006



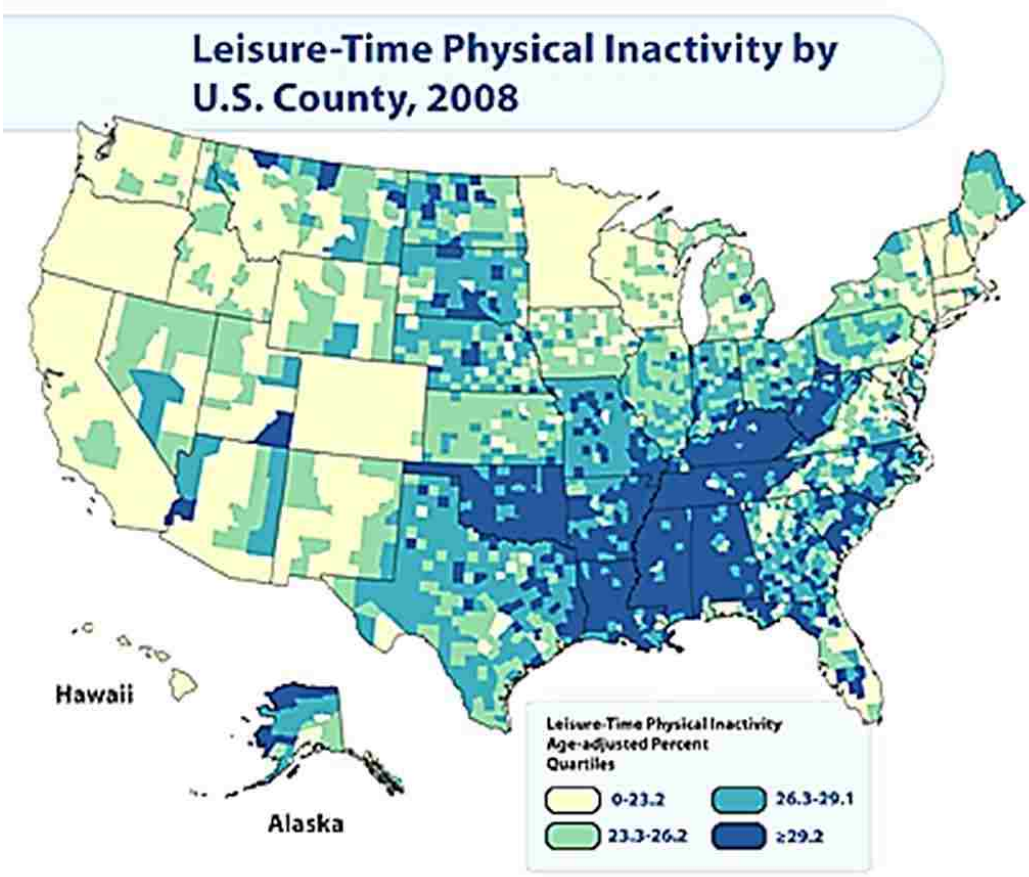
Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion

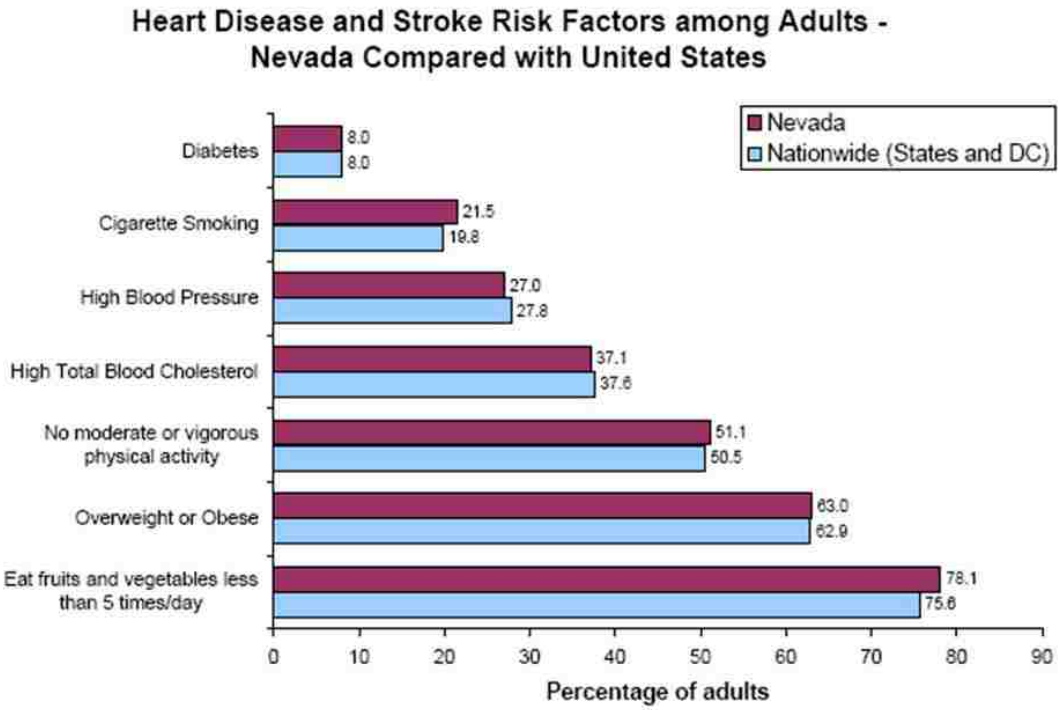
Nevada — Stroke Hospitalization Rates
Total Population, Ages 65+, Medicare Beneficiaries, 2000 – 2006

Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion

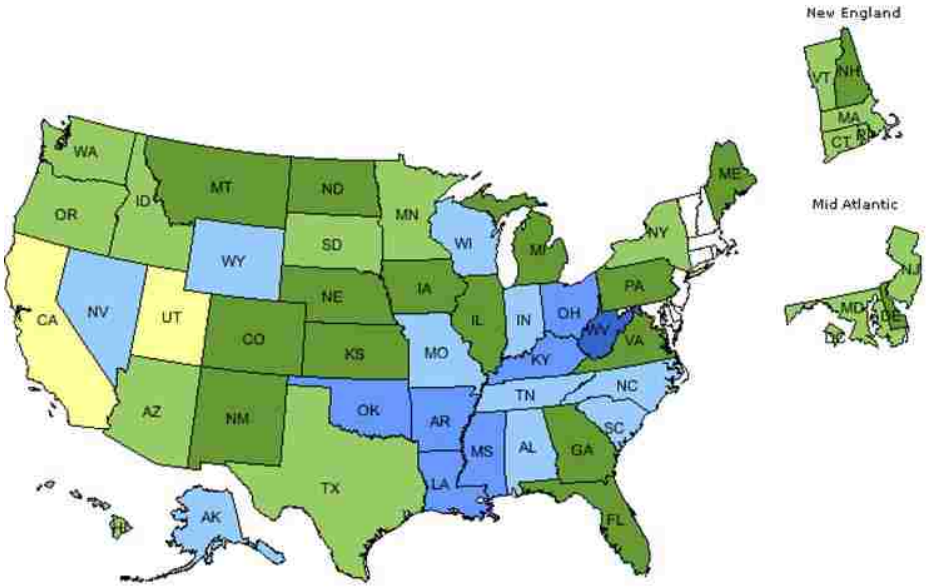
APPENDIX G

BRFSS DATA




Heart Disease and Stroke Risk Factors among Adults -
Nevada Compared with United States
Nevada
Nationwide (States and DC)
Diabetes
8.0
8.0
Cigarette Smoking
21.5
19.8
High Blood Pressure
27.0
27.8
High Total Blood Cholesterol
37.1
37.6
No moderate or vigorous physical activity
51.1
50.5
Overweight or Obese
63.0
62.9
Eat fruits and vegetables less than 5 times/day
78.1
75.6
0
10
20
30
40
50
60
70
80
90
Percentage of adults

Cigarette Use (Adults) - BRFSS – 2010

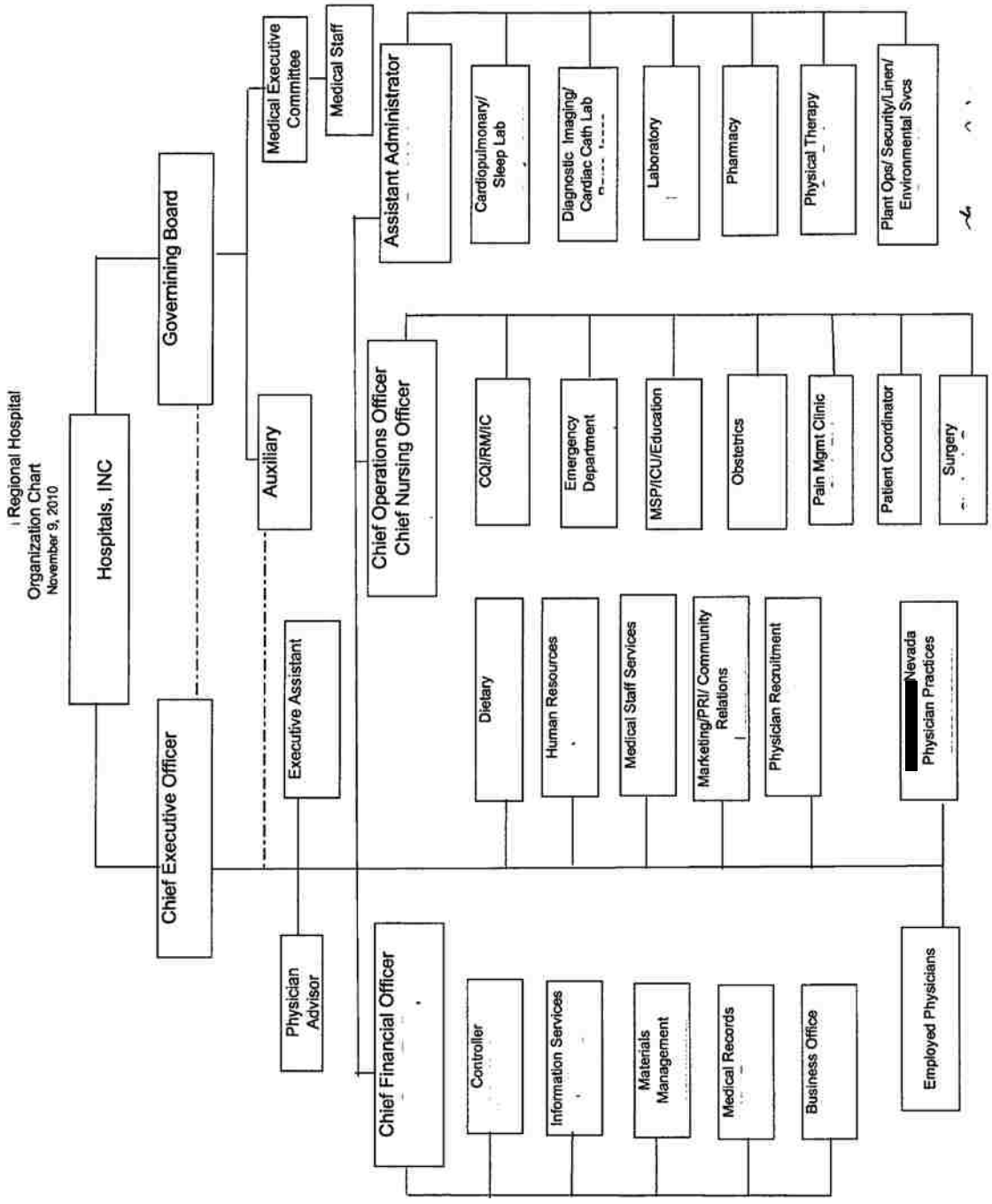


0-12.9 (2 States)
13.0-15.9 (16 States)
16.0-18.9 (16 States)
19.0-21.9 (10 States)
22.0-24.9 (6 States)
25.0+ (1 States)

Source: Behavioral Risk Factor Surveillance System (BRFSS)

APPENDIX H

ORGANIZATIONAL CHART



APPENDIX I

LETTER OF CONSENT

March 8, 2011

TO: UNLV Doctoral Program Director

FROM: Suzanne DelBoccio, CNO NNRH

SUBJECT: Review of Stroke Data

In pursuit of her doctoral proposal, Starla Ricks will be allowed to access the stroke data collected by Northeastern Nevada Regional Hospital (NNRH). Ms. Rick's doctoral research will benefit the care provided at NNRN through evaluation our stroke program strategies to improve compliance with defined stroke performance measures. NNRH is firmly committed to higher education for our nursing staff. Ms. Ricks has been a positive example and role model for many of the nurses, and we support her educational efforts.

Sincerely,

Suzanne DelBoccio, CNO
Northeastern Nevada Regional Hospital
2001 Errecart Blvd
Elko, NV 89801
775-748-2010

APPENDIX J

IRB APPROVAL

Biomedical IRB

Notice of Excluded Activity

DATE: January 27, 2012

TO: **Dr. Patricia Smyer,** School of Nursing

FROM: Office of Research Integrity – Human Subjects

RE: Notification of IRB Action

Protocol Title: **Program Evaluation of Stroke Protocol in a Rural Nevada Hospital**

Protocol# 1201-3997

-

This memorandum is notification that the project referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed excluded from IRB review. It is not in need of further review or approval by the IRB.

Any changes to the excluded activity may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a Modification Form.

If you have questions or require any assistance, please contact the Office of Research Integrity – Human Subjects at IRB@unlv.edu or call 895-2794.

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CURRICULUM VITA

Starla C. Ricks
283 Brooklawn Drive
Spring Creek, Nevada 89815
(775)753-8579
Sricks57@frontiernet.net

EDUCATION

2010-2012 University of Nevada, Las Vegas
Las Vegas, Nevada
Doctor of Nursing Practice 2012

2006-2009 University of Nevada, Las Vegas
Las Vegas, Nevada
Family Nurse Practitioner Program
Master of Science-Nursing 2009

2004-2006 Great Basin College
Elko, Nevada
Bachelor of Science-Nursing 2006

1997-2000 North Idaho College
Coeur d'Alene, Idaho
Associate in Science-Nursing 2000

PROFESSIONAL EXPERIENCE

2010- Present NORTHEASTERN NEVADA REGIONAL HOSPITAL
Elko, Nevada
Nursing Administration
Director of Wells Family Medicine
Family Nurse Practitioner – Board Certified

2009-2010 NEVADA HEALTH CENTERS, INC
Elko, Nevada
Family Nurse Practitioner – Board Certified

2006-2009 NORTHEASTERN NEVADA REGIONAL HOPITAL
Elko, Nevada
Director of Intensive Care & Medical/Surgical/Pediatrics & Education Services

2005-2006 NORTHEASTERN *NEVADA REGIONAL HOSPITAL*
Elko, Nevada
Nursing House Supervisor

2000-2005 NORTHEASTERN *NEVADA REGIONAL HOSPITAL*
Elko, Nevada
Registered Nurse

1999-2000 SILVERWOOD GOOD SAMARITAN CENTERS
Silverton, Idaho
Licensed Practical Nurse:

1991-1999 SILVERWOOD GOOD SAMARITAN CENTERS
Silverton, Idaho
Nursing Assistant Certified:

MEMBERSHIPS AND COMMITTEE WORK
2006-2009 National Honor Society Members
2006 Magna cum Laude
2006 Great Basin College's outstanding nursing student of the year.
2005-2009 NNRH Pediatric Committees
2007-2009 NNRH Patient Satisfaction Committees
2008-2009 Wound Care Committees
2010-2012 NNRH Policy Committees