

Fredrick Sandoval, M.P.A.
Deputy SecretaryGary L.J. Girón, M.B.A.
Deputy Secretary

October 7, 2004

**To: Governor Richardson
New Mexico State Legislators
Members of the Health and Human Services Committee**

Fr: Michelle Lujan-Grisham, Secretary of Health

Re: Senate Joint Memorial 31, Stroke Study

It is my pleasure to present to you a comprehensive final study report on Stroke in New Mexico, Senate Joint Memorial 31. The study was commissioned by the 46th Legislature in the Regular 2003 Legislative Session. As outlined in the memorial and the report, stroke is the third leading cause of death in the United States, behind only heart disease and cancer, with about 175,000 deaths each year. Another 750,000 Americans are disabled by stroke each year. I encourage you to review the report and executive summary to determine the next steps that has the ability to proactively impact stroke outcomes in New Mexico.

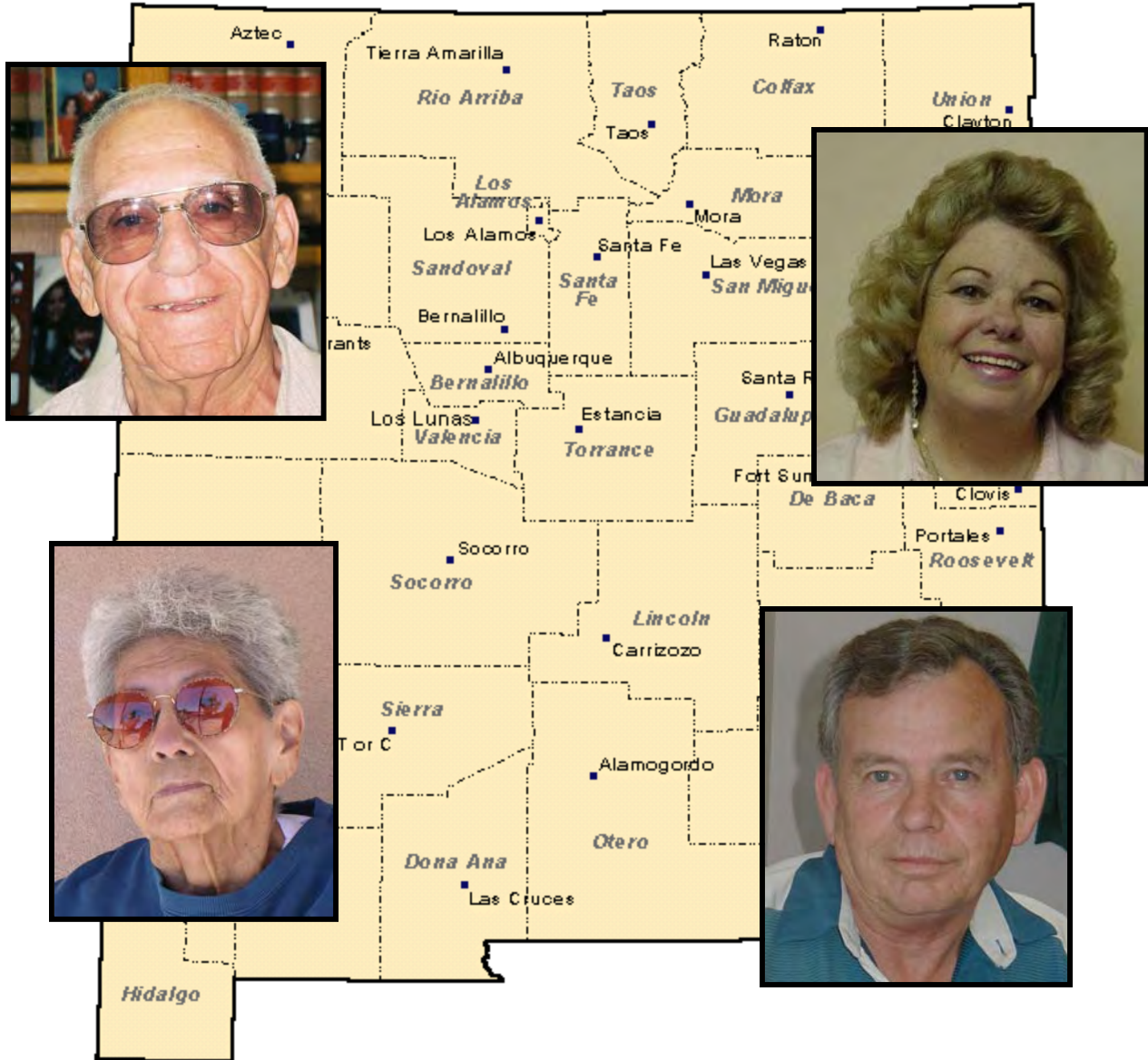
A key recommendation, which I support, is the establishment of an operational Stroke Program within the Department of Health. This initial step will provide the necessary staff to acquire federal grant funding to develop a comprehensive stroke program in the Department of Health.

The Stroke Task Force was assembled in June 2003 and completed their assessment and recommendations in September 2004. Dr. Glenn Graham, M.D., Chairman, Department of Neurology, UNM School of Medicine, served as chair of the Task Force. The Committee was composed of about 40 people, including the American Stroke Association and advocates in acute care, prevention, rehabilitation, and stroke survivors. The Stroke Task Force was staffed by Jim Derrick, EMS Program Director, Emergency Medical Systems Bureau. Please contact Jim if you have any questions about the report at 505-476-7824.

In closing, I wish to thank Governor Richardson and the New Mexico Legislature, as well as the Stroke Task Force for studying this crucial health issue. It is my hope that this study will lead to genuine improvements in the management of Stroke in New Mexico.

STROKE: THE CHALLENGE

A Report About Stroke in New Mexico



A Report to the Governor, Legislature and Department
of Health from the
New Mexico Stroke Task Force

September 2004





Fredrick Sandoval, M.P.A.
Deputy Secretary

Gary L.J. Girón, M.B.A.
Deputy Secretary

September 22, 2004

Honorable Governor, Members of the State Legislature and Secretary of Health:

On behalf of the New Mexico Stroke Task Force, we respectfully submit this report examining stroke prevention and treatment in New Mexico. The members of the Task Force represent multiple perspectives and disciplines who have come together under one common goal: to improve stroke outcomes for the people of New Mexico.

Please pay particular attention to the Executive Summary, which lists the key findings and recommended actions. These recommendations lay the foundation for the development of a comprehensive system of stroke care in our state.

The Task Force wishes to express their appreciation for enacting this important memorial as a first step to improving the cerebrovascular health in our state. We also are grateful for the stroke survivors who have shared their stories in this report so we may learn from their experiences.

Sincerely,

Glenn D. Graham, MD, PhD
Chair on Behalf of the NM Stroke Task Force

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I. EXECUTIVE SUMMARY

Stroke: The Challenge

Stroke is a devastating disease that can result in death or often life altering disabilities. Every day two New Mexicans die from stroke and eight more become stroke survivors. Stroke is the third most common fatal disease in New Mexico. The incidence of stroke in our state is predicted to grow twice as fast as the population in the next twenty years (Appendix B). Stroke sometimes gives a warning but it frequently goes unrecognized or sometimes occurs without warning at all. In 2002, the estimated hospital charges alone for stroke in New Mexico were \$65,418,910 (Appendix C). Treatment exists for acute ischemic stroke to reduce long-term disability, yet in 2001 in New Mexico, only 0.4% of eligible patients receive the treatment.²⁴ This is the bad news.

Stroke is a preventable disease. More than half of strokes could be prevented if risk factors were modified such as hypertension, heart disease, diabetes, and cigarette smoking. Stroke risk factors can be identified and reduced. The warning signs can be recognized and swift action can be taken to get the person to a facility where approved therapy such as the clot dissolving drug tissue plasminogen activator (tPA) is administered. When patients with ischemic stroke receive tPA within a three-hour window, the patient is at least 30% more likely to have minimal or no disability in three months compared with those that go untreated.²³ This is the good news.

Current Stroke Treatment And Prevention In New Mexico

Every second counts for stroke diagnosis and treatment. A system for rapid, effective stroke treatment does not exist in New Mexico. Beginning with the emergency medical system, the majority of pre-hospital providers report not having adequate stroke knowledge to assess patients. Even more did not know the critical time window to administer tPA.²⁵

Even when timely transport is initiated, most acute care hospitals around the state do not have the resources to begin rapid treatment with tPA. Sixty-eight percent (68%) of the New Mexico hospitals surveyed with emergency rooms staffed twenty-four hours a day do not have standing orders or clinical pathways established for stroke patients. Sixty-two percent (62%) of these hospitals stated their orders do not include the use of thrombolytic therapy such as intravenous tPA (Appendix E).

Stroke and cardiovascular disease has not been identified as a priority within the New Mexico Department of Health (NMDOH). Twenty-one states including New Mexico do not have Center for Disease Control and Prevention funding for Heart Disease and Stroke Prevention Programs. However, primarily through the Tobacco Settlement Fund, New Mexico spends over \$6 million dollars per year to address risk factors such as tobacco and obesity. State public health agencies nationwide spend less than 3% of their budgets on chronic disease programs yet chronic diseases such as cardiovascular disease and stroke are the nation's killers. The New Mexico DOH spends an estimated \$16 million on chronic disease, which is a little over 3% of the DOH budget yet specific programs to address cardiovascular disease or stroke do not exist.²⁶

Barriers And Gaps To Stroke Treatment And Prevention

The lack of a cohesive system of stroke care results in loss of life and disabilities for New Mexicans. Protocols do not exist in most settings to define the necessary stroke assessment and treatment needed in the emergency medical systems or in most hospitals. Even though the breakthrough technology of tPA was approved for use in 1996, many hospitals do not have the drug, include it in a treatment protocol or have the experience or resources to utilize tPA in people with ischemic strokes. Treatment protocols and clinical pathways must identify the use of tPA with tele-support or transport the patient to a designated primary stroke center.

The public does not recognize stroke warning signs. In 2000 a survey conducted in Albuquerque with 500 participants revealed that 62% could not name the most common stroke warning sign and 52% of respondents who had a stroke or had families members present did not call 911.²⁸ “Because time lost is brain lost” every second counts to reduce the long-term disabilities of stroke. The public must recognize a stroke and take action.

People must be aware of existing personal risk factors putting them at greater risk for stroke. Many New Mexicans have existing factors that put them at risk for stroke such as hypertension, high cholesterol, obesity, physical inactivity, diabetes and smoking. Some individuals are aware of their personal risk factors and others are not. According to the 2001 Behavioral Risk Factor Surveillance System, which interviewed over 3600 people in the state, the number of people in New Mexico who have never had their cholesterol checked is higher than in the U.S.

Recommendations To Meet the Challenge

Recommendations to address the barriers and gaps focus on developing a response and prevention system of stroke care in New Mexico. A comprehensive system of care has three major components:

- a standard of care for pre-hospital and hospital settings
- prevention education for the public and providers
- resources available to sustain the changes necessary to improve the system

A comprehensive systemic approach has been utilized to develop the New Mexico trauma system and address diseases such as diabetes, and patient outcomes have improved. To develop a **comprehensive system of stroke care in New Mexico**, the following priorities must be implemented:

1. Fund or designate a full-time a DOH staff position to focus on cardiovascular issues and develop a stroke system of care. This person will focus on securing program funds through CDC and local resources. Prevention activities will be coordinated with the Chronic Disease Bureau.
2. Develop a Stroke Advisory Committee to provide guidance and direction to the EMS Bureau and DOH on implementation of the comprehensive system of care.
Recurring General Funding: \$10,000

3. Implement a public stroke awareness campaign to teach people to recognize stroke-warning signs, to dial 911 and to increase awareness of risk factors. **Recurring General Funding: \$50,000**
4. Establish primary stroke centers for rapid stroke treatment throughout the state. Initial implementation should include: Albuquerque, Farmington, Santa Fe, and Las Cruces. Other geographical areas needed to maximize the state's coverage include: Silver City, Gallup, Clovis, Taos and Roswell. With the implementation of the initial areas, 50% of the state's population will be within 60 minutes of a primary stroke center. With implementation of all nine areas, 59% of the state's population will be within 60 minutes if a primary stroke center. The inclusion of simultaneous air ambulance dispatch has the potential to increase access however needs to be explored in more depth. **Funding: \$30,000 (one-time funding)**
5. Assure that every primary stroke center has an established pathway to rehabilitation services to promote continuity of care. **Funding: (Included in Recommendation #4)**
6. Develop a standard medical protocol for EMS treatment and transport of a stroke patient. This will include the implementation of a comprehensive stroke update for EMS providers every two years during relicensure. **Funding: \$5000 (one-time funding)**
7. Develop a stroke registry (similar to the trauma registry) to gain the needed information to improve stroke outcomes. **Funding: \$6,000 one-time funding for equipment and \$4,000 recurring for maintenance of stroke registry**

FUNDING TOTALS

Recurring:	\$ 64,000
One-time:	\$41,000
TOTAL:	\$105,000

Conclusion

Stroke is a devastating disease that wastes human potential and has a staggering affect financially on individuals, their families and the health care system. The development of a comprehensive stroke system of care through implementation of these recommendations will better prepare hospitals and the emergency medical system to meet the challenge of treating stroke patients promptly. The public will be better educated to take action to modify risk factors and know how to recognize the warning signs of stroke. Because "time lost is brain lost" the Task Force urges prompt action now to begin a stroke prevention and treatment campaign for the benefit of all people living in New Mexico.

II. INTRODUCTION

During the 2003 NM Legislative Session, Senate Joint Memorial 31 (SJM 31) was passed to examine stroke prevention and treatment in New Mexico. Recognition of the devastating physical and financial impact of stroke in New Mexico prompted creation of the memorial.

In June 2003, then Department of Health Secretary Patricia Montoya appointed the New Mexico Stroke Task Force. The Task Force was charged with making recommendations to improve stroke awareness and access to stroke care and treatment; decrease morbidity and mortality from stroke; and to develop a system of stroke care including the designation of Stroke Care Centers. The Department of Health partnered with the American Heart/American Stroke Association to complete this study. The Emergency Medical Systems Bureau contracted with Public Health Consultants to assist with the development and writing of the final report.

The Task Force has 40 active members (Appendix A). The Task Force includes: Stroke Survivors, Caregivers, Physicians in the Pre-Hospital, Emergency, Acute Care and Rehabilitation Areas, and Non-Profit Stroke Support agencies. **Glenn Graham, M.D. PhD.**, Director of the Cerebrovascular Disorders at the Veterans Medical Center and UNM Health Sciences Center was appointed Chairperson. **Ms. Rachel O'Conner**, the Executive Director of the New Mexico Brain Injury Foundation was appointed as Vice Chairperson.

The sources for information in this report include: assessments of the public, providers, hospitals, and stroke survivors; knowledge and expertise of Task Force members; medical literature; and resources from the American Stroke Association, National Institute of Neurological Disorders and Stroke, and the New Mexico Department of Health.



I am now sixty-four years old and I had my stroke in 1988. I was employed for twenty years as a research scientist at the Inhalation Toxicology Research Institution and I worked and traveled a great deal of the time. My wife and I also had a busy family life and that was very stressful at the time. I did not have any warning signs other than that, but during a party at our house I had a severe stroke. I was semiconscious for about one week, but I drifted in and out of my awareness that something was wrong with me. I did not know I had a stroke until a few weeks later.

The things that changed my life were my inability to move freely with my right side paralyzed and aphasia, which caused me to re-learn my alphabet, sentence structure, paragraph compilation and speaking once again. I worked at my job for one-year, but it was too stressful so I took leave of my position. My depression lasted for two years and I took medication to relieve my symptoms.

In the sixteen and one half years since my stroke, I do gardening, household jobs, joined the Stroke Club, run the Aphasia group, joined Sports and Wellness Athletic Club and do wood working as a hobby. The partial loss of my independence was devastating to me; however, I have learned how to drive and get around better so I can visit my children and grandchildren.

Dick Cuddihy

III. STROKE BASICS

A. **Impact of Stroke**

Stroke is the 3rd most common fatal disease in New Mexico. Heart disease and cancer are the first and second causes of death in our state. Two New Mexicans die every day from stroke and there are an estimated 8 stroke survivors every day.²

In the United States, stroke is the 3rd leading cause of death preceded by heart disease and cancer. Approximately 750,000 strokes occur annually and almost 20% of stroke victims die within the first days. On average, a stroke occurs in the U.S. every 45 seconds. About every three minutes, someone dies of stroke.¹

In the next twenty years, the total number of strokes is predicted to increase. In fact, stroke incidence will increase twice as fast as the population of the state (Appendix A).

Stroke is the leading cause of long-term disability. While stroke is a disease of the brain, it can affect the entire body. Stroke impairs many critical neurological functions resulting in a broad range of physical and social disabilities. The long-term consequences of stroke can include paralysis, cognitive deficits, speech problems, sensory deficits and emotional difficulties. These disabilities can cause daily living problems affecting the ability to live alone or maintain a household. Assistance may be required with shopping, handling finances, home maintenance, or medications. Some stroke victims require full time care.

Motor Impairments: The inability to move the face, arm and leg is one of the most common impairments. This motor impairment can occur in varying degrees including the possibility of paralysis.

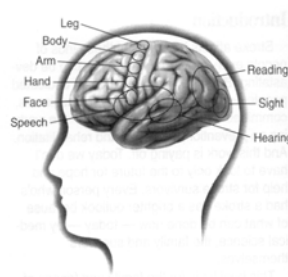
Cognitive: Impairments in memory, attention, and orientation are common in stroke. Ability to learn and retain new information can be affected.

Speech problems: Difficulty to understand and use language both spoken and written can be impacted. Disturbances in comprehension, naming, repetition, fluency, reading, writing, or speech clarity can also be present.

Sensory deficits: Numbness, tingling or altered sensitivity can be experienced.

Emotional difficulties: Depression is the most common affective disturbance seen after a stroke. Symptoms include loss of energy, lack of interests, loss of appetite, and insomnia.

The economic costs of stroke are extreme. In 2004, an estimated \$53 billion will be spent on the direct and indirect costs of stroke in the U.S. This figure includes direct costs (EMS, hospital, physicians, nursing homes, medications, and home health care) and indirect costs (loss of wages for survivor and/or caregivers, changes in family structure.²⁰ Based on the number of occurrences in New Mexico, an estimated \$65,418,910 was spent on hospital care in 2002. This figure does not include physician charges or the costs of rehabilitation.



Stroke effects:

- Senses
- Motor Activity/
- Speech
- Behavior
- Thoughts
- Memory
- Emotions

One commercial health plan in New Mexico, has stated stroke ranks among the top ten disease states for allowed costs.²⁷ For another health plan stroke costs in 2002-2003 represented 1.25% of their total health care costs and cardiovascular disease represented 7.63%.²⁸ And yet another commercial plan that does not offer Medicare or Medicaid products, states the costs for stroke ranks in their top 25 diagnoses.²⁹ The predicted increase in stroke survivors in the state will add to the economic burden to individuals, health plans and the healthcare system. The need for stroke survivor nursing care will increase and may or may not be available because of the lack of available nurses practicing in rehabilitation, long-term care, and home health care settings.

These costs will escalate further if this epidemic is not halted and reversed. U.S. Health and Human Secretary Thompson noted that chronic diseases and conditions, including heart disease and stroke, consume more than 75% of our nation's health care dollars, yet they are largely preventable.¹⁵



I was 51 years old when I had my stroke. On a Thursday morning as I was getting ready to go to work, I was not feeling well at all. I went to work but soon asked to go home to lie down for a while. I had a headache, dizziness and slurred speech. Little did I realize that I would never see that laboratory again. I spent 30 days in the hospital and did not return to work as instructed by my primary care doctor.

My stroke was caused by hypertension. My biggest challenge with my stroke has been dealing with the chronic pain. Pain is gauged by a 1 to 10 scale, 1 not being bad and 10 being very bad and brings tears to my eyes. I am taking enough medication to put a horse to sleep, and through my treatment at the pain management clinic my pain is managed to a 1 or 3. However my pain is a 7 as I write my story.

Today I went to a stroke support session where I meet with other stroke survivors that ranged from 10-15 members. This really is a good thing because I get involved with other stroke survivors and we plan picnics, parties, potlucks and a host of other events.

Sonny Chavez

B. Types of Stroke

Stroke is a cardiovascular disease that affects the blood vessels supplying blood to the brain. A stroke occurs when the blood supply bringing oxygen and nutrients to the brain is suddenly interrupted by a blood clot or when a blood vessel bursts spilling blood into the spaces surrounding brain cells. This blockage or rupture keeps part of the brain from getting the oxygen it needs. Without oxygen, nerve cells in the affected area cannot function and die within minutes. The part of the body these brain cells control can also not function, which can lead to death.

Stroke is a brain attack. Stroke is the damage that results when circulation to the brain is interrupted. The same process happens to the heart during a heart attack affecting the hearts ability to function. A brain attack results in multiple neurological impairments affecting a person’s ability to fully function.

There are two types of stroke: **ischemic** and **hemorrhagic**. 85% of all strokes are ischemic and 15% are hemorrhagic. Ischemic strokes occur because a blood vessel supplying blood to the brain is occluded. Hemorrhagic strokes occur because an artery in the brain ruptures.

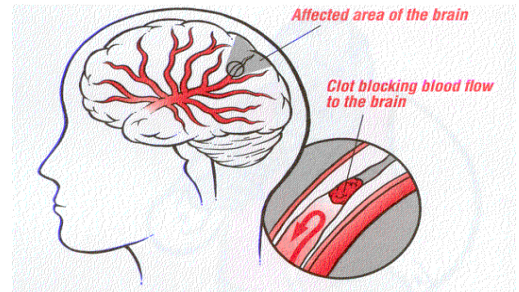
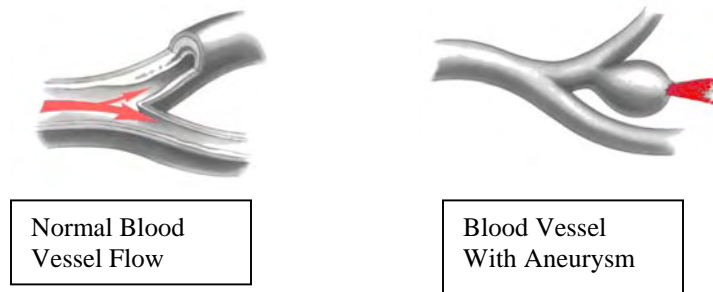


Figure 1

Ischemic strokes are caused by a vessel blockage preventing adequate blood flow to the brain. The blockage may be caused by a blood clot that develops within the brain artery itself, a thrombus, or a blood clot that arises elsewhere in the body and travels to the brain, or an embolus. Both obstruct cerebral blood circulation. An ischemic stroke, caused from vessel occlusion, is illustrated in **Figure 1**.

A **transient ischemic attack (TIAs)** is a warning sign of a stroke. TIA is a temporary disruption of blood flow to the brain the produces symptoms of a stroke but not permanent injury. TIA symptoms usually disappear within an hour or less. Every year 500,000 Americans experience a TIA and about one-third of these will develop a stroke.⁷

A **hemorrhagic** stroke is due to vessel rupture as illustrated in **Figure 2**. The vessel rupture occurs within the brain (intracerebral) or in between the brain and the lining of the brain (subarachnoid). In general, people with hemorrhagic stroke appear more seriously ill and have a more rapid course of deterioration that those with ischemic stroke. Headaches, disturbances in consciousness, nausea, and vomiting are common with hemorrhagic stroke particularly subarachnoid. Often the onset of a headache may be so sudden and severe that the person seeks medical attention.



Normal Blood Vessel Flow

Blood Vessel With Aneurysm

Figure 2
One type of Subarachnoid Stroke

C. Warning Signs of Stroke

The warning signs of an ischemic stroke or transient ischemic attack (TIA) may be subtle with only mild facial paralysis and speech difficulty but they indicate a potentially life threatening neurological illness. Stroke symptoms depend on what part of the brain and how much is affected. Stroke symptoms differ from a heart attack, where chest pains can be an identifiable and prominent symptom. The warning signs for stroke are:

- sudden weakness or numbness of the face, arm, and e.g., especially on one side of the body;

- sudden confusion, trouble speaking or understanding;
- sudden trouble seeing in one of both eyes;
- sudden trouble walking, dizziness, loss of balance or coordination;
- sudden severe headache with no known cause.

Swift action is needed for anyone experiencing these warning signs to reduce the potential long-term effects of stroke. This includes calling 911 and seeking immediate medical attention.

I was 56 year old and on June 2nd 2002 I had just finished cooking breakfast for my husband and I on that life changing morning. About seven months before I had been diagnosed with diabetes. Thru diet and exercise my diabetes was under control and I had lost 60 lbs. in about 6 months and was feeling very good about myself. I was now able to buy clothes so much easier to fit my new slimmed down figure. I enjoyed artwork "miniature painting" and life was good. Then BLAM, POW ZAP...life changed. I still fall over, my right leg drags, right arm very limited, speech slow, can't paint and can't do the exercises I used to do, and can't cook the way I used to. To compensate already hindered by "alexia" condition since birth. Brain impairment won't let me read a word.



The stroke occurred that Sunday morning starting with just an uneasy feeling. We went to the pharmacy to get something; the pharmacist suggested I check my blood pressure at the machine. It was fine. We returned home and we sat down in a chair, my husband noticed that I was holding the electric bill in my left hand (and I am right handed) and I was just staring at it. He asked me to tell him the amount of the bill but I could not talk. He asked me to move my right arm and I could not. He asked me to move my right leg but I could not. Stroke. Then about six weeks after the first stroke another came in my right eye. I still have only partial vision. Some plaque or something in the eye vein blocked the blood flow. I am alive and try to think positively and not dwell on the past, but my brain just doesn't work right anymore after the plaque in my body finally lodged in my left hemisphere in my brain.

Dianna E. Jack

IV. STROKE IN NEW MEXICO

A. Stroke Affects Everyone

Fortunately, the overall stroke death rate in New Mexico is slightly lower than the national average. The stroke death rate in the U.S is 121 per 100,000. In New Mexico, the death rate is 105 per 100,000. However, the burden of stroke is not evenly distributed in the population. **Figure 3** illustrates how all counties in our state are affected.

Stroke Death Rates, 1991-1998
New Mexico, Total Population Ages 35+

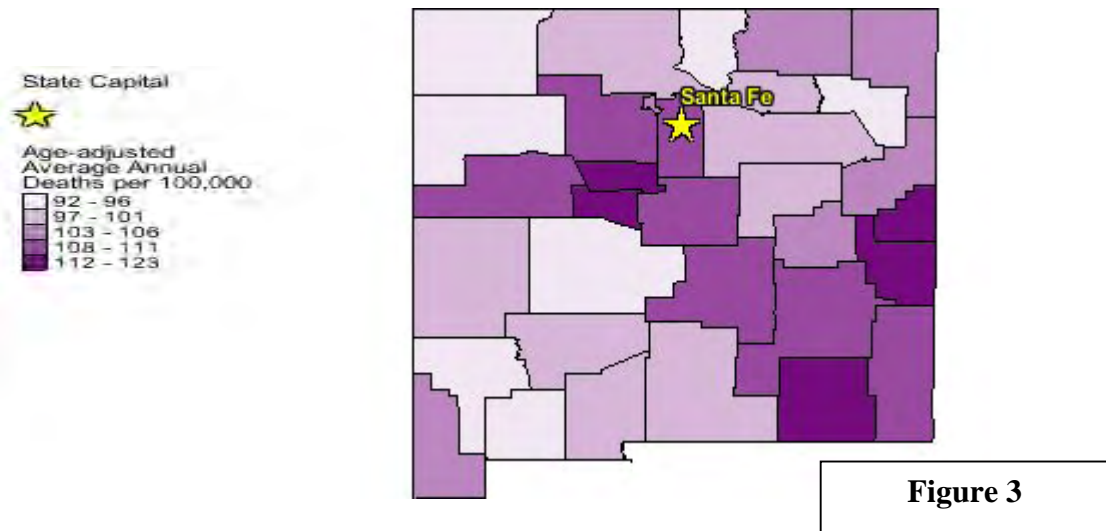


Figure 3

Centers for Disease Control and Prevention, Cardiovascular Branch. Interactive Maps of Cardiovascular Disease Mortality. (13)

B. Racial Disparities

Hispanics and Native Americans are disproportionately affected by stroke when compared to the U.S. rate for the same populations. However when compared to the New Mexico rate, they are only slightly higher or even lower. The New Mexico stroke rate for Hispanics (this includes data for Hispanics in all racial groups) is 106 per 100,000 while the nation's rate for the Hispanic population is 79 per 100,000. Native Americans in our state have a stroke rate of 85 per 100,000 while the nation's Native American rate is 79. The rate for New Mexico's Asian population is also slightly higher than the U.S. rate.⁸ The differences are highlighted in Table 1.

This disparity cannot be fully explained, however research indicates that minority populations may have more risk factors than other races. One study identified that communities with the lowest levels of social and economic resources available to community members related to high rates of stroke mortality. Communities may have inequalities in their environments and some are more health promoting than others resulting in health disparities. Environments expose individuals to risk factors such as lack of economic opportunity, poverty, and social isolation that contribute to the adoption of unhealthy behaviors such as poor diet, cigarette smoking and physical inactivity.¹³ Some rural populations may never seek medical care because of the barriers of distance.

Table 1. New Mexico Stroke Death Rates, 1991-1998

Race and Ethnicity	State Population 1998 (over 35)	State Rate* * 1991-1998	U.S. Rate 1991-1998
American Indians and Alaska Natives	54, 153	85	79
Asians and Pacific Islanders	9,922	108	105
Blacks	18,877	107	166
Hispanics	285,305	106	79
Whites	760,509	106	117
Total Population	843,461*	105	121

*Average annual age-adjusted rate (deaths per 100,000) for people ages 35 years and older. Data for Hispanics are also included within each of the four categories of race.

**Stroke death rate per 100,000 for all residents ages 35 years and older, directly age adjusted to the standard 2000 U.S. population

Centers for Disease Control and Prevention, Cardiovascular Branch. Interactive Maps of Cardiovascular Disease Mortality. (13)

I was supposed to attend a conference in Hawaii in December 1994. Instead I ended up rehabilitating from a stroke. That was 10 years ago. I woke up one morning feeling ill with what I thought was the flu. When my wife handed me something, it slipped from my grip and fell and I realized I had no feeling in my hand and arm. My wife recognized this as a stroke symptom.

The stroke affected the left side of my body. I wouldn't be attending the conference in Hawaii but I didn't want to miss the upcoming legislative session. I negotiated with my physician who allowed me to go to Santa Fe as long as I promised to continue his therapy. So I used a cane and spent three days a week going from the Capitol to the hospital for stroke rehabilitation therapy. By April I no longer needed a cane.

With the help of successful rehabilitation the following July 4th, I was even able to participate in a family tradition of walking a treacherous rock trail at El Morro. With someone behind and in front of me to help with my balance, the family walked together.

Stroke is often a risk factor for heart disease and I became aware of this when I required bypass surgery for blocked arteries. In addition, I was diagnosed with Type 2 diabetes. I feel like I have lived a healthy life, not drinking or smoking. I now continue to manage my health by watching my diet, exercising and faithfully taking my medications.

Senator Joseph Fidel

(Senator Joseph Fidel has been a State Senator with the New Mexico State Legislature for 32 years and is Vice Chairman of the Finance Committee.)



C. Stroke Risk Factors In New Mexico

Stroke is one of the most preventable of all life-threatening health problems.³

Although some strokes occur without warning, most stroke victims have prior risk factors. The most important risk factors for stroke are hypertension, heart disease, diabetes, and cigarette smoking. Other risks include: heavy alcohol consumption, high blood cholesterol levels, illicit drug use, and genetic and congenital conditions.⁹

“For people with a history of heart disease or stroke, the risk of dying from cardiovascular disease increases to 4.3 times normal risk if they have even one uncontrolled risk factor, and it goes up to almost six times greater when they have two or more uncontrolled risk factors.”¹⁴ Stroke risk factors need to be known and addressed. Many New Mexicans have risk factors that need modification. By modifying known risk factors, the risk of stroke would be reduced.

The Behavioral Risk Factor Surveillance System (BRFSS) is an ongoing nation-wide system that collects prevalence data about health conditions. The NM Department of Health, Office of Epidemiology Survey Unit, conducts the survey in New Mexico and analyzes the information. This telephone survey conducted in 2002 interviewed 3621 people in our state. Table 2 illustrates how New Mexicans are at risk for stroke.

Table 2. Percent of adults (age 18+) reporting various stroke risk factors by race/ethnicity, New Mexico BRFSS 2001.

Risk Factor	White	Hispanic	American Indian
High blood pressure	21.1	17.5	18.3
High cholesterol	21.3	15.1	12.4
Diabetes	4.8	8.1	6.9
Tobacco Smoking	22.8	25.9	20.2
Physically Inactive	20.8	32.8	27.5
Obesity	50.1	65.0	67.0

While there is some variation among racial groups, most notable is the consistently high percentage of New Mexicans with modifiable risk factors such as obesity, physical inactivity and tobacco smoking.



I was 30 years old when I had my stroke. I was driving when I experienced numbing sensations and a TIA. My biggest challenges I have had to face are: learning to walk again, the loss of intellect, loss of organization, perpetual confusion, and loss of math. I used to be an accountant and I'll never be able to do that again. I was a professional musician. I'll never be able to that again! I'll never be able to work again! I have no marketable skills! I have a learning disability! I volunteer at a nursing home four days a week for four hours a day. I am active in the Stroke Club but 75% of my time is still empty.

My doctors told me at the time of my symptoms that I was experiencing an “inner ear disturbance” not a TIA. Then after my blood clot and cerebral hemorrhage my doctors then told me it was a stroke. I had been on blood thinning medication at the time of my symptoms so the likelihood of suffering such a massive stroke would be much less likely.

Don Chacon

V. STROKE TREATMENT AND PREVENTION IN THE U.S.

A. STROKE TREATMENT

In past years, patients and physicians have thought treatment for stroke was hopeless. Over the years, with emerging research and knowledge about the treatment for strokes, outcomes have improved for stroke victims as well as mortality and cost reduced.

Clinical pathways, practice guidelines, stroke units and stroke teams have revolutionized the delivery of care to patients with acute stroke, bringing about most of these improvements in clinical outcomes.¹⁰

1. The Stroke Chain of Survival

Underlying all the improvements for stroke care is the understanding that *every second counts*. To increase a stroke victim's chance of survival and to reduce long-term disability, swift precise action must occur within three hours of the onset of symptoms.

The administration of thrombolytic or "clot busting" drugs within three hours of the onset of symptoms helps to destroy the clot and restore blood circulation. These drugs can drastically limit the extent of brain injury.¹¹

Eight years ago, tissue plasminogen activator (tPa), a thrombolytic drug was approved by the Food and Drug Administration. Today tPa is administered in less than 2% of eligible patients across the county. In New Mexico, it is used 0.4% of the time.²⁵ A few urban centers have achieved 19% tPa utilization through a coordinated effort. These include University of Texas in Houston and University of California in San Diego.

In spite of these medical advances and the knowledge that rapid evaluation and treatment would improve the outcome for all stroke patients, progress has been slow. Several conferences of the National Institute of Neurological Disorders and Stroke (NINDS) have convened to examine stroke treatment and the low use of thrombolytic treatment in acute stroke patients. The barriers include: the majority of stroke patients not presenting to a hospital within the three hours of stroke onset; and effective models for acute stroke treatment teams not in use in most hospitals across the county.

Operation Stroke an initiative of the American Stroke Association/American Heart Association is a program initiated to increase a person's chance of surviving a stroke. This program emphasizes the "chain of survival" starting with rapid recognition of stroke warning signs; to early access to emergency medical personnel and transport to a hospital with available treatment; rapid diagnosis and treatment at the hospital; and appropriate rehabilitation. The first three steps are the steps that need to be executed within the three hours of onset of stroke symptoms. The American Stroke Association/American Heart Association is also focusing on the development of hospitals as Primary Stroke Centers within a comprehensive system of stroke care.

2. Stroke Treatment Guidelines

Over the last decade, the American Heart Association/American Stroke Association and other leading professionals in the field have developed treatment protocols. These treatment protocols provide guidance on the latest and most effective treatment for strokes. The implementation of these guidelines can improve the outcomes for stroke patients.

3. Lessons From The Trauma System

Many lessons can be learned from the success of the trauma system. Regionalized trauma care, designated sites to expedite treatment and the development of trauma care treatment protocols are all part of a system that assure the delivery of advanced life support in a timely manner. With a well-organized system in place, morbidity and mortality can be reduced and lives can be saved.

4. Stroke Centers

Hospital stroke centers have the potential to improve patient care and outcomes for stroke patients. Key elements for stroke centers include: acute stroke teams, stroke units, written care protocols, and an integrated emergency response system. These centers are prepared to act rapidly and initiate appropriate treatment within the three-hour window. A small number of hospitals in the United States have become certified under this program.

As of February 2004, there is a nationwide certification program to evaluate the stroke care provided by hospitals. The program is a collaborative effort between the American Stroke Association and the Joint Commission on Accreditation of Healthcare Organization (JCAHO). This voluntary certification allows hospitals to become recognized in communities by the emergency medical system, healthcare providers and consumers as Certified Primary Stroke Centers.

5. Creative Solutions in Rural Areas

Many states have overcome the extra challenges faced by long distances between treatment centers. Creative solutions have included: telemedicine and teleradiology, regional stroke networks, efficient use of air and ground transport and education initiatives. For example, in five rural counties in Texas a public and professional educational campaign was launched. Through news articles, public service announcements, and billboards the public became aware of stroke symptoms and the benefit of rapid treatment including calling 911 to get prompt medical attention. For emergency room physicians, treatment protocols were introduced and hands-on practice treating mock strokes were conducted. In six months after the end of the program, about 11 % of stroke patients received tPa compared to only about 1% of stroke patients in five other counties that did not have the campaign.²²

I was 84 years old when I had my stroke. I had been living on my own in New Laguna since my husband died in 1987. On the evening of April 14, 2002 I had the stroke and could not get out of the chair to change my clothes to go to bed. Since I was alone, I stayed in my chair all night until my son came over to check on me first thing the next morning. I wasn't able to talk and I had weakness on my right side. My son called the Acoma/Laguna/Canoncito ambulance and they took me to the hospital for diagnostic tests. After a transfer to Albuquerque for more testing, they determined I had a stroke.

The hardest part has been not able to be out and about helping others, going to meetings, attending my church or different social activities. I had been a part of the State Agency on Aging Policy Advisory Committee for many years ever since former Governor Bruce King had appointed me. Even with macular degeneration I continued to participate with the help of a reader, but after my stroke participation became too difficult.

After the initial depression I experienced because of the stroke, I have begun to be more accepting of my limitations. However, because of my limitations, I currently am living at the Laguna Rainbow Care Center. My advice for other elders is to take extra good care of themselves and visit their physician regularly. Elders should also remain independent as long as they can.

*Mildred Kie Pradt
(told by daughter Linda Morales)*



B. PREVENTION

1. Recognizing the Warning Signs

Most people do not recognize the symptoms of stroke. The inability of patients and bystanders to recognize stroke symptoms and to quickly access the emergency medical system are the largest barriers to effective stroke therapy.⁴ This lack of recognition delays treatment and affects the outcome for the stroke patient. The national average time from symptom onset to contact with the healthcare system ranges from 3-6 hours but is often much longer in rural areas.¹² In a 2003 national survey conducted by the American Heart Association/American Stroke Association, only 1% identified stroke as a major health concern. Few people would call 911 immediately if they thought someone was having a stroke.¹² In 2000, an Albuquerque area study revealed that only half of people who were present when a family member had a stroke called 911.¹⁹ Once the warning signs are recognized, swift action must occur to get treatment within the three hour window of time.

2. Reducing Risk Factors

Stroke is one of the most preventable of all life-threatening health problems.³ Some strokes occur without warning, but most stroke victims have prior risk factors.¹⁷ The best way to prevent a stroke is to modify or eliminate as many risk factors as possible.

There are three types of risk factors for stroke:

- Those that can be treated modified or controlled with the help of a physician. These include high blood pressure, diabetes, atrial fibrillation, carotid artery disease and a history of TIAs.
- Those a person can modify by changing lifestyle, such as smoking, high blood cholesterol, physical inactivity, obesity, excessive alcohol consumption and illegal drug use.
- Those you cannot do anything about. These include age, gender, race and family history.⁶

Modifiable Stroke Risk Factors

- | | |
|--|------------------|
| • High blood pressure | Diabetes |
| • Obesity | High Cholesterol |
| • Sedentary life style | Tobacco Smoking |
| • Unhealthy diet | Heart Disease |
| • Atrial fibrillation/irregular heart beat | |

Over half of strokes could be prevented if risk factors were modified. The most important risk factors for stroke are hypertension, heart disease, diabetes, and cigarette smoking. A reduction in high blood pressure can significantly reduce the occurrence of a stroke.³ Cigarette smoking is a key risk factor for stroke and can be eliminated by stopping tobacco use. Other steps to reduce risk factors for stroke include: checking blood pressure, a low fat diet, physical activity, taking prescribed medications and alcohol in moderation.

3. Support for public health programs to prevent heart disease and stroke is low.

Currently state public health agencies expend less than 3% of their budgets on chronic disease programs, including heart disease and stroke prevention.¹⁵ Currently, 32 states have CDC Heart Disease and Stroke Prevention Programs funding, 21 as capacity building grants

and 12 as basic implementation grants. The national goal is to have sufficient funding for every state.¹⁵

C. FUNDING OPPORTUNITIES

1. STOP Stroke Act

The Stroke Treatment and Ongoing Prevention (STOP) Stroke Act was introduced in last year's U.S. Congress. This Act would fund a national campaign on stroke prevention and awareness, establish a grant program for states to assure stroke patients have access to quality care; develop a national stroke registry; and provide medical education on stroke.

The Act received unanimous support in the Senate and overwhelming support in the House. Congress did not complete action on the Act before adjourning for the year. However new versions of the bill were introduced in the House and Senate in December 2003. As of this writing, the STOP Stroke Act has passed the House. The Act has support from many organizations including the American Academy of Neurology.

I retired April 2002 after working 30 years with the Federal Government. Six months after I retired, I had a stroke. In October 2002, at age 59 I went on a fishing trip out to the ocean (where I became violently ill from motion sickness or maybe it was a TIA), on the trip home, I began to exhibit a severe headache and eyes that ached. Since in my case, there were no risk factors such as high cholesterol, high blood pressure, or diabetes, my wife and I were not overly alarmed. I took three or four Tylenol and the headache was gone. This happened about twice before my stroke, even on the day before my stroke, I experienced blurring and vision problems, which I ignored out of ignorance.



On November 28, 2002 about 11 a.m. while preparing Thanksgiving dinner, I suffered a TIA (this is what the ER doctors stated). I began to drop things and couldn't hold anything in my hands and eventually fell to the floor, my face on the left side drooped and was told I was wide-eyed. At the ER, I was given an aspirin and a CAT scan and sent home. I came home somewhat shaken and rested the rest of the afternoon. I frankly don't recall much that day. But at about 6:30 p.m. the same day, while my wife and I were watching TV, I suffered a massive stroke and was again rushed to the ER. After a CAT scan, my wife was informed I had suffered a massive stroke to the right side of my brain. The doctors were surprised that someone as young as myself had such a large stroke. I was given tPA barely within the three-hour window, but it apparently did nothing to unclog the major clot of the right carotid artery.

What challenges I have incurred since that terrible day! Just getting out of bed each day and facing the extreme difficulties of dressing, walking and sitting are challenges in themselves. I am unable to do any of the activities I did before. I was very active with golfing and fishing. I was very handy and quite a fixer of projects needed to be done at home. I maintained our yard, cooked frequently and helped my wife with household duties. Probably the most devastating loss is my inability to drive thus having to depend on someone to take me any and everywhere I need to go. The list of the losses of physical abilities goes on and on.

I suffer a great deal of pain on my entire left side of my body. The pain interferes with my therapies. We have and continue to incur a tremendous amount of our retirement annuities to pay for private therapists. Continued out of pocket expenses on our part could eventually lead to bankruptcy since the insurance only allows a limited amount of coverage. We have applied for VA benefits, but this takes a very long time and we are still waiting to be processed and get a doctor assigned.

This stroke has drastically altered my life and the lives of my family. I was once a vital and active person and am now reduced to just a semblance of the man I was. But life goes on and you take each day at a time and make the best of the abilities you have left. You can only hope that someday others will not have to suffer the way I do.

George Luna

VI. CURRENT STROKE TREATMENT, REHABILITATION AND PREVENTION IN NEW MEXICO

To understand a current picture of stroke treatment, rehabilitation and prevention in the state, elements of the health system were surveyed and information gathered to develop a complete picture of stroke care in New Mexico. The elements surveyed include:

- Medical providers
- Hospital Emergency Rooms
- Rehabilitation Services
- Stroke Survivors and Caregivers

Other recent survey information from other sources has also been utilized including: emergency medical providers and the public. Key stakeholders were also interviewed to understand the current status of stroke treatment, rehabilitation and prevention in New Mexico.

A. TREATMENT

1. Medical Providers

Family practitioners, internists, and emergency room physicians were surveyed to assess their knowledge, attitudes and beliefs about stroke. A total of 569 surveys were sent with 63 returned, an 11 % response rate (Appendix D). The low response rate for physicians was disappointing for the Task Force and makes it difficult to interpret the results. However, there are a few common themes between the provider survey and other data sources. They include:

- Concern about the emergency treatment for stroke in emergency rooms because of the lack of emergency room and hospital resources. The hospital survey confirmed that all hospitals do not have the necessary resources to conduct aggressive stroke care.
- A desire for more public education about how to reduce the risk of stroke. Data from the hospital survey also strongly indicate the need for public education to assist in risk reduction for stroke. The Behavioral Risk Factor Surveillance System (BRFSS) also confirms that many New Mexicans have multiple stroke risk factors such as hypertension, high cholesterol, obesity and physical inactivity. The BRFSS indicates that the number of people in New Mexico who have never had their cholesterol checked is higher than the region and the U.S.

2. Emergency Medical Providers

In 2000, a statewide survey of emergency medical providers was conducted to assess the level of stroke knowledge.²⁶ Over 200 emergency medical providers from throughout the state responded. The majority of the respondents practiced in a rural setting.

Key findings include:

- 45% could not define a transient ischemic attack correctly
- 64% did not know the time window for tPA
- Only 21% had received greater than 5 hours of initial training on stroke

- 47% think their stroke knowledge is inadequate

3. Hospital Emergency Rooms

The assessment of hospital emergency rooms focused on the Tier 1 hospitals, those acute care facilities with emergency departments staffed 24 hours a day, 365 days a year (Appendix E). Of the thirty-nine Tier 1 hospitals sent surveys, 23 responded, a 59% response rate. The survey results indicate the following:

- 68% of the hospitals do not have standing orders or clinical pathways established for stroke patients
- 62% stated their orders do not include the use of thrombolytic therapy such as intravenous tPA
- 82% of hospitals would be interested in available resources to establish a stroke protocol
- Eight hospitals currently have the required resources to become an accredited stroke center
- 61% stated their case management department did not have written criteria for the next level of care for a stroke patient

4. Transportation Times

In emergency situations, New Mexico depends on ground transportation via ambulance to get patients to hospitals for treatment. The average response time in the state for EMS is 9 minutes with another 4 minutes required to assess the situation. In an average of 13 minutes, EMS is transporting the person to a treatment facility. Dispatching air ambulance can take longer with an average of 9 minutes to get off the ground plus the time to reach the site (Appendix H). However once a patient is transported to a hospital, most are not equipped to diagnose the type of stroke or to administer tPA for patients experiencing an ischemic stroke.

My husband was 67 when he had the “big one”. He had had ministrokes starting three years before. We found his blood pressure was high and he was a heavy smoker at the time. He had an MRI and was told he’d had a mild stroke. He had complained of dizzy spells and tingling in his hands. One morning he got up and couldn’t pronounce words. I took him to the ER and the doctors were not a lot of help. He should have been hospitalized but was not. As an outpatient his insurance company only allowed him nine weeks of speech therapy even though the neurologist requested more. Not only was his speech affected, his behavior was bizarre and uncontrollable. It was a difficult time.

His physical health is fairly good now. He’s had no paralysis. His endurance and strength are gone. He suffers from cognitive impairment and aphasia. He insists, still, that he can drive and he believes he can still hunt and fish like in the past. He does little but watch TV but is very aware of current events and remembers people and things that I have forgotten. He loves to spend time with his grandkids now; his anger is gone compared to years ago.

He showers and dresses himself sometimes with help. I believe he continues to have mild strokes I can tell by his speech and incontinence. The bottom line-Drs. should be more aware of those who have strokes. Not just medically but emotionally. They need to advise families and caregivers. I’m sure some do. Mine didn’t.



Wife of Art Kinsky

B. REHABILITATION

Rehabilitation for stroke is critical so stroke survivors can regain optimal health and restore as much independence as possible. Rehabilitation from stroke is a slow process. However 80% of stroke survivors will walk at the end of a year and 40% return to work and will drive a car.¹⁸ Rehabilitation requires a team of skilled professionals to help the individual regain the ability to perform a variety of daily activities ranging from walking to dressing to swallowing. Physical, occupational and speech therapists are an important part of the rehabilitation team.

Rehabilitation services include: inpatient and outpatient rehabilitation centers, skilled nursing facilities, home health care services, and other support services needed to resume daily life activities. Important support services include: financial assistance, transportation, and support groups.

In the past twenty years there has been a growth in the number of facilities identified as rehabilitation facilities.

1. Inpatient Rehabilitation Facilities

Currently, there are six major inpatient rehabilitation facilities in New Mexico. These are rehabilitation programs certified through Joint Committee on Accreditation of Healthcare Organizations to provide hospital services. They include: HealthSouth Rehabilitation Hospital in Albuquerque, Rehabilitation Hospital of New Mexico in Albuquerque, New Mexico Rehabilitation Center in Roswell, Life Course in Farmington, New Mexico Veterans Administration Healthcare System in Albuquerque and St. Vincent Hospital in Santa Fe. Three Facilities in New Mexico are listed as accredited by the Commission on Accreditation of Rehabilitation Facilities: Rehabilitation Hospital of New Mexico, New Mexico Veterans Administration Healthcare System, and St. Vincent Hospital.

A telephone survey was conducted to assess the capacity of the existing rehabilitation units. Three of the five rehabilitation units responded to the assessment. The results showed the following:

- One of the three rehab facilities have designated stroke beds
- Two facilities have stroke care protocols in place
- All have physical, occupational and speech therapists available
- All facilities offer outpatient treatment
- Two of the three centers offer stroke support groups
- All three offered patient and family stroke education services

2. Long-Term Care Facilities

In 2003, a survey was sent to 82 members of the New Mexico Health Care Association. These members include Skilled Nursing Facilities, Intermediate Care Facilities and Assisted Living Facilities. Twenty-five facilities or 31% responded.

The results are as follows:

- Most facilities offer physical, occupational and speech therapies as well as counseling services.
- On-site medical coverage included: primary care and psychiatry. Off-site medical services were additionally available from: physiatrists, neurologists, and other physician specialty services.
- The rehabilitation team was lead by the medical director, nurse or therapist.
- 72% or 18 respondents stated they did not use any type of pathway, standing order sets or guidelines for referrals.

The availability of on-site advanced technology to regain maximum ability to conduct activities of daily living was limited:

- 68% did not have computer assisted technology available for teaching and training patients
- 48% stated alternative communication devices to communicate needs for non-speaking individual were not available
- 36% did not conduct video swallow assessments to assess the client's ability to swallow, but sent individuals elsewhere
- 80% stated that environmental control equipment, for individuals with spinal cord injury, was not available

3. Stroke Survivor and Caregiver

A survey was sent to 480 stroke survivors and caregivers throughout New Mexico (Appendix F). 134 responded to the survey resulting in a 28% response rate. This survey was sent to the mailing list of the Stroke Clubs of New Mexico.

- 61% of respondents stated they were not educated on stroke signs and symptoms prior to the stroke
- 63% of respondents had their stroke over three years ago
- 85% stated that education on stroke issues was important
- 33% lost their job after the stroke
- Multiple comments were made about needing information about resources post stroke.
- 73% identified the importance of financial aid as important after discharge

4. Stroke Support Groups

Stroke support for stroke survivors and their families is a critical component of rehabilitation. Interaction with other stroke survivors can help reduce the isolation and stress related to post stroke recovery for both the survivor and their caregiver. Some stroke survivors may isolate themselves because “they don’t want to be seen like this.” Social interaction is critical to help the stroke survivor feel normal again. Support is essential for the caregiver to be able to maintain their role and minimize the overwhelming aspects of care giving.

Currently, Stroke Clubs of New Mexico have six clubs throughout the state. There are clubs in Albuquerque, Las Cruces, Rio Rancho, Santa Fe, and Truth or Consequences. In the recent past there have been clubs in Belen, Alamogordo, and Silver City but they have been disbanded.

Volunteers operate these clubs. In addition to organizing activities and meetings, they conduct fundraising events to raise money for their newsletter and other club expenses. This all-volunteer group elects officers and so far in the Albuquerque Club's history, all the presidents and vice-presidents have been stroke survivors.

The Albuquerque Stroke Club has a thirty-year history of providing opportunities for stroke survivors and caregivers to promote and maintain independence; provide stroke information; offer social interactions and develop resources to serve the needs of stroke survivors and their families.



I had my stroke in October 1992 while I was sleeping. I was paralyzed on my right side and I could not talk. I got up and fell to the floor. I was alone so I crawled to the door of my bedroom, opened it and crawled to the phone in the living room. I called 911 and then found I could not speak.

The biggest challenges for me have been learning to speak and learning to walk. I was always left-handed so I didn't have to contend with relearning how to write and eat.

I am doing well now. I am retired and live alone. I can drive and I walk with the aid of a cane and brace. I am happy and content.

Maureen McGrew

C. PREVENTION

1. General Population

In 2000, the American Heart Association completed a telephone survey among the general population in Albuquerque and Denver.¹⁹ Five hundred people participated. This survey was designed to determine the public's awareness of signs and symptoms of stroke and basic knowledge about stroke treatment. The results for Albuquerque are as follows:

- 62% of respondents could not name the most common stroke warning sign (weakness or numbness in the face, arm, or leg)
- 27% of the respondents did not know to call 911 if they knew someone they knew experienced signs and symptoms of stroke
- 36% did not know that people can take measures to reduce their risk of stroke
- 46% did not know there are emergency treatments for stroke
- 52% of respondents who had a stroke or were present when their family member had a stroke did not call 911

2. Community Awareness

Multi-media Campaign

Currently there is a national multi media stroke awareness campaign being implemented by the American Heart Association/American Stroke Association (AHA/ASA). The "I Am A Stroke" ads have been developed and are currently on radio and television. This year the Ad Council selected the campaign as one of three non-profit messages to promote this year throughout the country. Billboards have been placed in New Mexico.

Posters emphasizing the importance of knowing your risk for stroke and the importance of responding to stroke warning signs by dialing 911 have been placed in a variety of locations around the state.

Community Education Programs

The American Heart Association/American Stroke Association offer community education programs such as the Annual Stroke Survivor and Caregiver Conference, stroke lectures, CPR training and community health screenings for risk factors. In May, for National Stroke Month over 500 people were screened at a Torrance County Health Fair. Screenings include: blood pressure, cholesterol, glucose, body mass index and identification of risk factors. In May, the Isotopes sponsored a game on behalf of the American Heart Association/American Stroke Association. This public event promoted awareness of stroke.

De Corazon a Corazon is a new AHA/ASA faith-based program aimed at heart health and stroke prevention. This program utilizes a coordinator in a church, parish, synagogue setting to reduce the risk for cardiovascular disease. This program primarily focuses on Latinos/Hispanics who are at greater risk of physical inactivity, overweight and obesity and diabetes. This program has not been implemented in New Mexico.

Publications

Many printed and on-line publications exist for stroke education for both the public and professionals. For example, the American Stroke Journal, the Stroke Connection magazine for stroke survivors, the Operation Stroke newsletter. The American Stroke Association maintains an information line 1-888-4STROKE.

My name is Carlos Diaz. I had a stroke on January 19, 1976, five weeks after my twenty-third birthday. The stroke was the result of a blood clot going to my head following surgery for a broken back a month earlier.

I moved to Albuquerque in 1987 from Boise, Idaho after numerous failed attempts to get a college education. College was too fast and overwhelming for me because of cognitive impairments resulting from the stroke.

But doors opened for me here in Albuquerque as a result of volunteering. I got married-yes, I volunteered- and have been honeymooning for seventeen years as of July 18. I am a Peer Counselor and for the last eleven years have facilitated support groups for Stroke Survivors for the Albuquerque Stroke Club.

The Albuquerque Stroke Club has been a springboard; launching me in a pursuit of helping others through counseling, writing, humor therapy and camaraderie all of which increase my quality of life exponentially.

Although I can't recommend having a stroke to improve one's life, my stroke, over time, is serving to be one of my greatest assets. A challenging opportunity to grow and experience my potential as a Stroke Survivor through peer interaction.

Carlos Diaz



VII. BARRIERS TO STROKE TREATMENT AND PREVENTION IN NEW MEXICO

A. TREATMENT

1. Lack of an Organized System of Care

Currently, a system for rapid, effective stroke treatment does not exist in New Mexico. An effective system of care must include the pre-hospital or EMS systems and acute care hospitals. The current gaps and barriers to an organized system of care for stroke are as follows:

A. Lack of a uniform system among EMS providers to assess the stroke victim's status. Proper recognition of acute stroke by EMS providers is critical. Currently, some EMS providers are taught to utilize either the Cincinnati or Los Angeles pre-hospital stroke assessment scales, however the scales are not necessary routinely used. A standard stroke assessment scale is needed to strengthen the communication and practice among providers throughout the state.

B. Lack of a standard medical protocol for EMS treatment and transport of a stroke patient.

Upon activation of a 911 system, providers of various levels of licensure respond to the medical emergency and treat within their scopes of practice and according to the local services' medical protocols. The medical protocols vary from location to location. A standard medical protocol for all pre-hospital providers needs to be developed to strengthen a system of communication and practice. Currently, EMS Regulations do not include language or guidance about a system for transport of stroke.

C. The stroke treatment capabilities in New Mexico hospitals vary greatly.

Currently, among the 39 hospitals with 24 hour coverage, 7 days a week, only eight hospitals currently meet the requirements to become an accredited stroke center. The variation among hospitals often depends on the availability of financial and human resources. Teleradiology could be used by rural hospitals to gain access to physician specialist resources.

D. Lack of stroke data collection.

Currently, standard stroke data are not collected in our state. The collection of a standard set of stroke data is necessary to assure that stroke patients are assessed and treated appropriately. Collected data must be compiled and evaluated to make improvements in stroke care. This data collection process needs to work similarly to the trauma registry operated by the EMS Bureau in the DOH in use throughout the state.

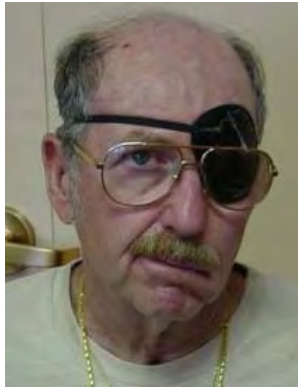
2. Rural Nature of New Mexico

With many New Mexicans living in rural areas, access to treatment can be delayed. Distances to hospitals, available technology to communicate with other hospitals such as telemedicine techniques to transfer information to others; and even available personnel to implement necessary actions are limited. A patient experiencing stroke symptoms for greater

than three (3) hours has exceeded the normal window for receiving thrombolytic therapy, in the form of tPA, to reduce the disabling effects of stroke.

3. Lack of Financial Reimbursement for Acute Stroke Care

Currently, there are financial disincentives to use thrombolytic therapy such as tPa. For example, hospital and physician reimbursement is the same whether or not tPa is administered. The value added of administering tPa and thus reducing many of the long-term disabilities has not been recognized by third party payers. In 1998 an analysis showed that the average cost savings when tPA administered was \$4255.00 per treated patient. An analysis using today's dollars would no doubt indicate a higher savings per patient. These savings are a result of decreased length of stay in the hospital, decreased need for skilled nursing facilities and decreased utilization of rehabilitation when tPA is administered.²²



I was 48 years old and living in Denver, Colorado when I had my first stroke. It was early morning on December 25, 1997 at about 7 a.m. I don't remember any warning signs, I may have had some but like most people, I ignored them. I was in bed at the time and person that was with called 911. When the medics arrived, I was transported to Porter General, A Heart Hospital. The neurosurgeon was making his rounds and he told the medics to take me to Swedish Memorial and he would be right there. He did a spinal tap and concluded that I had had a stroke. My stroke was caused by a mass of blood vessels in my brainstem that weren't formed properly called an arterial venous malformation or AVM. Most people with this condition have a stroke before they are 30.

I was not able to do much of anything for about a year but I gradually improved. Probably the hardest thing for me to adjust to was the loss of my independence. Before my stroke the only person I depended on was myself but after the stroke I had to learn to depend on someone else. That was extremely difficult for me.

As for now I am doing well, I'm alive, and that's much better than the alternative.

Marvin Taylor

B. REHABILITATION

1. Financial

The financial barriers for stroke survivors are immense. The inability to work for a period of time or permanently; lack of insurance benefits to cover the costs of treatment and rehabilitation; and delay or lack of disability benefits to meet basic needs are often experienced.

Rehabilitation for stroke survivors is important to maximize their independence. Once receiving benefits, Medicare and some other insurance policies pay for only 90 days of treatment. When the 90 days has ended, the financial responsibility is up to the survivor and their family. If rehabilitation is not complete and the family cannot afford more services, some survivors may be placed in nursing homes or others may be able to receive home health care.

Medications are needed to help manage some of the disabilities post stroke. Medications are also need to assist in the prevention of a second stroke from occurring. Medications can be prohibitively expensive for some stroke survivors. Until recently Medicare did not cover

any prescription drugs. If Medicare beneficiaries subscribe and pay for the new Medicare prescription plan with a limited formulary, they may be able to receive some medications at a reduced cost. The effects of this new plan are unknown at this time.

Disability benefits can be available through Social Security. Once a stroke survivor applies, it can take a long time to receive benefits. Other assets are considered in an applicant's eligibility for benefits such as a home and car. Applicants can be placed in the position of choosing to keep their home and car or receiving disability benefits.

2. Support for Stroke Clubs of New Mexico

Participation in stroke support groups is critical to the well-being of both the stroke survivor and caregiver. Stroke Clubs of New Mexico have made a tremendous impact of reaching out and supporting stroke survivors and caregivers. However, operating only from a volunteer base supporting their activities through fundraising has limitations. The leadership would like to see better ability to reach out to stroke victims to provide support and reduce isolation. Transportation to club meetings is a barrier to participation for members of the Albuquerque Stroke Club. Many members do not drive at night and if activities are in the evenings even more members are unable to drive and therefore participate.

3. Lack of Available Rehabilitation Equipment

Technology has greatly advanced the rehabilitation options for stroke survivors. Computer assisted technology; environmental control equipment and alternative communication devices have improved rehabilitation outcomes yet the availability is limited in New Mexico. Emerging therapies such as retraining muscles, an approach used to train different muscles to replace those that have been impaired by damaged brain cells, is a popular approach for stroke survivors yet only available in Las Cruces.

I was 48 years old when I had my stroke in 1997. The only symptom I had was a headache. I had just gotten out of bed when I noticed I had a bad headache. My biggest challenges have been learning to walk; now I need to use a cane and the ability to talk. I am in an aphasia group to help me learn to talk.

I am not able to do household chores but I can't drive. I lost my independence and it was hard to adjust and I am still adjusting.

Deborah Scheutz



C. PREVENTION

1. Lack of Public Knowledge and Action

To minimize or avoid the death and disability associated with stroke, prompt action is required. Action starts by recognizing the warning signs and calling 911. Unfortunately, most people do not recognize the warning signs and most people are hesitant to call 911. This lack of action delays the treatment necessary to reduce the long disabilities associated with stroke and avoid possible death.

2. Existing and Unknown Risk Factors

Many New Mexicans are at risk for stroke due to existing risk factors such as obesity, tobacco smoking, physical inactivity, high blood pressure, high cholesterol and diabetes. Some people may not even be aware these are risk factors for stroke or if they even have the risk factor. For example, the 2001 BRFSS indicates that the number of people in New Mexico who have never had their cholesterol checked is higher than in the U.S.

3. Lack of Dedicated Public Resources to Address Stroke

State public health agencies spend less than 3% of their budgets on chronic disease programs, including heart disease and stroke prevention.²¹ Yet these problems are the top causes of morbidity and mortality in our country and our state. Currently, in the NMDOH, there is not a stroke prevention program or even a cardiovascular program nor any dedicated positions to address these important issues.



I had a stroke at age 39. I must admit I knew nothing about stroke before it happened to me. I thought they only happened to old folks not to someone my age in such good health. I was very active in quite a few activities that kept me in good shape physically. A local company employed me where I had worked for almost 20 years. The day before (or during) my stroke I only had one symptom. That was a very severe headache. It wouldn't let me concentrate on anything or perform any task that required thought. Not even simple addition or subtraction. Trying to only caused the pain to worsen. I managed to finish my workday and then drive home. The pain seemed to subside later that evening at home. But that night I felt very "strange" before I went to bed. Nothing in particular just strange in a way I had never felt before. I went to bed and fell asleep.

The next morning I awoke early and felt I had to go to the restroom: but when I tried to get out of bed I couldn't. After a fall to the floor my very worried wife called my brother, a doctor for advice. He told her to call 911, he thought I had a stroke. From that point until much later that morning I was slipping in and out of consciousness caused by the stroke and being very tired. I do remember the crew of the ambulance discussing how to get me off the floor. I am 6 ft. 5 inches tall and weight 235 pounds. I was sent for tests, CAT scans and Doppler to discover what had happened to me. They found my right carotoid artery had a dissection "separation" that had temporarily blocked the flow of blood to my right brain. It was now open and blood was flowing normally. (The doctors agreed that no operation was needed. It seemed to be a condition left to heal on its own.) Then everyone explained what a stroke is and that I was paralyzed on my left side. It didn't all really soak in except the part about being paralyzed. After a couple of weeks (seven) stay I was sent to a rehab hospital. Once there I began working in therapies: physical, occupational and speech for recovery. Then the next blow came. My employer sent the dept. manager to see me and tell me not to worry too much about occupational therapy because I had been fired. I was furious!! But I was also very determined to walk again and to perform as many of prestroke activities as possible. I worked extra extra hard in therapy and got out of the wheelchair and walked. Although I walked I did have to use a cane and a brace for my left foot and ankle, my wife stood by through the first difficult and dark months. I am sure it wasn't easy. I was angry and depressed. My wife and I ended up separated and are divorcing. Something I am told is fairly common. I began looking for things to do with myself. I joined the Albuquerque Stroke Club. I took classes to become certified to teach hunters safety classes to the NM Dept. of Game and Fish. I became certified instructor for both Firearms and Bow instruction. I took Broadcasting classes at UNM passed and became an "on air certified." I am now seven years passed my stroke and working hard to find my place in life. I still feel like I am going to beat this thing one way or another.

Leroy Montoya

VIII. RECOMMENDATIONS TO STROKE TREATMENT AND PREVENTION IN NEW MEXICO

A. TREATMENT

The recommendations are divided between pre-hospital and hospital interventions. These Recommendations are made to implement an organized system of care in New Mexico.

To develop a stroke system of care there must be a full-time cardiovascular position funded in the DOH. The Task Force recommended that this activity be placed in the EMS Bureau to coordinate and develop a stroke system of care. This person will focus on securing program funds through CDC and local resources. Prevention activities will be coordinated with the DOH Chronic Disease Bureau and the American Heart Association/American Stroke Association.

I. PRE-HOSPITAL

1. **Expand initial training on stroke treatment and transport in the regular EMS curriculum.**

Currently, EMS providers are relicensed every two years. The committee recommends that stroke updates are included in the education EMS providers are receiving every 2 years for relicensure.

2. **Uniform use of one stroke assessment scale to assess patient status.** The Los Angeles Stroke Scale is the standard scale to be used by EMS providers to assess patient status. This scale is a more comprehensive scale and provides more information than some scales currently in use. All EMS providers (about 7000) will require re-training on the Los Angeles Stroke Scale. Los Angeles Stroke Scale is in Appendix F.

3. **Develop a model protocol for EMS treatment and transport of stroke.**

Once stroke is recognized, following a standard protocol would assure that treatment is consistent and essential components for stroke treatment in place. Protocols would detail the use of ground ambulance and transport for immediate treatment to a stroke center including early notification to the receiving hospital. A standard protocol would strengthen the system of care by providing consistent pre-hospital care throughout the state. The model protocol would be presented to the EMS Medical Direction Committee and the EMS Joint Organization on Education Committee, which approves the Scope of Practice and reviews EMS formal training, respectively.

4. **Use of ground ambulance transport to designated stroke treatment centers.**

By establishing stroke treatment centers around the state, delays in treatment time can be substantially reduced. Specific dispatch protocols would be developed to direct the EMS providers to the nearest stroke treatment center. This system would work similar to the existing trauma system that immediately transports patients needing special trauma interventions to designated trauma centers. The inclusion of simultaneous air ambulance dispatch has the potential to increase access however needs to be explored in more depth (Appendix I).

I was 50 years old when I had my stroke. The only symptoms I experienced were just feeling tired all the time. Everything has been a challenge since I have had a stroke. Now I am doing as good as can be expected.

Jane Wert



II. HOSPITAL

1. Implement standard guidelines for acute stroke treatment.

Standard treatment protocols for ischemic and hemorrhagic stroke (based upon American Stroke Association and other comparable guidelines) need to be in place in all Tier One hospitals in the state.

2. Establish Primary Stroke Centers in Albuquerque, Farmington, Santa Fe, and Las Cruces.

Establish primary stroke centers for rapid stroke treatment throughout the state. Initial implementation should include: Albuquerque, Farmington, Santa Fe, and Las Cruces. These four sites are recommended initially as they currently meet the required guidelines to become a certified stroke center. Other geographical areas needed to maximize state's coverage include: Silver City, Gallup, Clovis, Taos and Roswell. With the implementation of the initial areas, 50% of the state's population will be within 60 minutes of a primary stroke center. With implementation of all nine, 59% of the state's population will be within 60 minutes if a primary stroke center. These sites will provide broad geographic coverage to meet timely treatment needs including administration of tPA as appropriate. The inclusion of simultaneous air ambulance dispatch has the potential to increase access however needs to be explored in more depth.

3. Develop system of stroke data collection.

Data collection of a standard set of stroke data is necessary to assure that stroke patients are assessed and treated appropriately. Collected data must be compiled and evaluated to make improvements in stroke care. This data collection process needs to work similarly to the trauma registry in use throughout the state to make ongoing improvements in care.

I was 77 years old vacationing in Florida and played golf the previous day when my putter dropped out of my left hand without reason. Thought it was probably my arthritis.

The following day (February 17, 1999) my wife, small dog and I were preparing to leave on an early morning flight: to return to our home in Los Lunas, NM. When I tried to open the dog's traveling kennel, I realized my left hand didn't work. My wife and nephew noticed that my speech was also slurred and my mouth sagging. Instead of going to the airport my nephew drove me directly to the closest hospital where I was admitted immediately. The diagnosis was stroke and I was treated with tPA as soon as possible and sent to Intensive Care in a larger hospital for further treatment and tests. I was hospitalized at Naples, Florida for three weeks undergoing more test and therapy. In two weeks after being dismissed from the hospital, I was permitted to fly home with my wife and continued therapy in Albuquerque on an outpatient basis for several months.

I am still unable to use my left arm and hand as well as a swallowing dysfunction, weakness in the left leg, memory loss, inability to drive and increased loss of hearing.

I have lost my independence in being unable to drive, do household maintenance, and handle personal needs such as showering and dressing. Also my memory retention has been affected and I can no longer handle family finances. With assistance from my wife we are "getting along".

Dale Gunn



B. REHABILITATION

1. Develop a fund to provide financial assistance for stroke survivors who are waiting for benefits or need a low interest loan to cover personal expenses.
2. Provide financial assistance to Stroke Clubs of New Mexico to assist with transportation and aphasia therapy for stroke survivors.
3. Develop a resource guide for stroke survivors and their families with information about assistance. Guide needs to include information on disability resources including social security and Medicaid.
4. Assure that every primary stroke center has an established pathway to rehabilitation services to promote continuity of care.

C. PREVENTION

1. Implement a public campaign, sponsored by the NMDOH, directed at the public to reduce prehospital delay time.

The campaign should include:

- Recognize the signs of stroke combined with quick action to call 911. The basic message is “every second counts”.
- Use print media, radio and television to deliver a culturally relevant message to the general population and at risk groups.
- Increase awareness about the risk factors.
- Use existing NMDOH publications such as the *Diabetes Corner* to provide stroke information and education to seniors. An article will highlight stroke in the August edition.
- Use promotoras for outreach and education to at risk populations. Currently, Rio Arriba County, the Border Health Office in Las Cruces and Presbyterian in the South Valley use promotoras.
- Utilize “Corazon de Corazon”, a faith based initiative to promote stroke information, education, and screenings to churches and synagogues.

I was 53 years old when I had my stroke. I was at work when I had a headache, which was the only symptom I experienced. I have aphasia so talking has been my major challenge. I am walking and talking now considerably better but I still have aphasia.

Lenny Mangano



IX. CONCLUSION

Stroke is a devastating disease that wastes human potential and has a staggering affect financially on individuals, their families and the health care system. New Mexico has an opportunity to reduce the devastation caused by stroke by strengthening the systems that interact with the stroke survivor. Implementation of the cited recommendations will better prepare hospitals and the emergency medical system to meet the challenge of treating stroke patients promptly. The public will be better educated to take action to modify risk factors and know how to recognize the warning signs of stroke. Because “time lost is brain lost” the Task Force urges prompt action now to begin a stroke prevention and treatment campaign for the benefit of all people living in New Mexico.

I am a 56-year-old businessman, inventor and lobbyist living in Albuquerque. I had a stroke one year ago. I was playing golf early on a Sunday morning, coming home to household chores and going to bed a short time later. I awoke with the right side of his body paralyzed, and couldn't speak. It was sudden with no warning signs.



The stroke affected my ability to speak and walk. With lots of hard work and rehabilitation with therapists and with determination, I have regained many skills. One of my challenges is being as articulate as I was before my stroke, a skill I prided myself given my profession. Now I feel like I can't express myself as eloquently. This hasn't stopped me from continuing as an advocate for stroke. I would love for legislators to tour a rehabilitation facility to get an idea of what a person goes through as a survivor and to see what great services the therapists provide.

I haven't worked in the vending business since my stroke. However I am always busy with new projects. While I was relearning how to dress myself, the rehabilitation therapist told me to buy pants with an elastic waist in order to make it easier for me to dress. I didn't like that idea, so I invented a device that helps fasten buttons without the use of my right hand.

Raised on a ranch in Texas I know what it is like to work hard. I have even taught myself to play golf using my left hand. One of these days I will be able to hold my baby granddaughter, Ravyn, with both my hands. And when she is old enough, I will take her fishing and golfing. I have no doubt I'll be able to do this.

Ken Anderson

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APPENDICES

Appendix A. New Mexico Stroke Task Force Members

Appendix B. Stroke Incidence Projection Model for New Mexico: 2005-2025

Appendix C. Hospital Stroke Admissions to New Mexico Care Hospitals in 2001-2002

Appendix D. New Mexico Stroke Task Force, Provider Survey 2004

Appendix E. New Mexico Stroke Task Force, Hospital Survey 2004

Appendix F. New Mexico Stroke Task Force, Stroke Survivor Survey 2004

Appendix G. Los Angeles Stroke Scale

Appendix H. Helicopter Transport from Scene Improve Access To Stroke Care

Appendix I. Impact of Expanding Stroke Care Centers in New Mexico

APPENDIX A.

NEW MEXICO STROKE TASK FORCE MEMBERS

*Executive Committee

Altaf Ahmed, MD
HealthSouth Rehabilitation Hospital

Joe Anderson, Pharm. D
UNM School of Medicine

Patty Anello
NM Department of Health
Chronic Disease Bureau

Erin McDonald-Bicknell*
American Heart/Stroke Association

Lynn Bryant, MD*
Private Practice Physician

Paul Cochran, MD
Presbyterian Healthcare Services

Jim Derrick*
NM Department of Health
EMS Bureau

Sheran Dodd, EMT-Intermediate
Belen Fire Department, Rescue #8

Jennie Saavadra Duran, MS. CCC-SLP*
Sandia Rehabilitation Hospital of NM

Joie Glenn
NM Association for Home and Hospice
Care

Glenn Graham, MD, PhD*
UNM-HSC and VA Medical Center

Yolanda Inman, MSN, RN*
Lovelace/Sandia Health Systems

David Johnson, MD
Albuquerque Stroke Club

Patsy Trujillo Knauer
Aging and Long Term Care

Pat Larragoite, DDS
Health Policy Commission

Rosa Matonti, MSN, RN, CDE, CNS*
Molina Healthcare

Sheri Milone
Sandia Rehabilitation Hospital of NM

Natasha Ning
American Heart/Stroke Association

Rachel O'Conner*
Brian Injury Association of NM

Eva Pacheco, MD
Private Practice Physician

Karen Parko, MD
Navajo Nation

Fred Pintz. MD
NM Department of Health
Office of Health Emergency Management

Mike Richards, MD*
NM Department of Health

Mike Romo, EMT-Paramedic
Albuquerque Fire Department

Dee Rush, Hospital Administrator
Sierra Vista Hospital, T or C
NM Hospitals and Health Systems
Association

Linda Siegle

Resources for Change

Randy Torbett, EMT-Paramedic
Deputy Chief
Bernalillo South Rehabilitation Hospital

Cindy Walczak*
NM Department of Health
Wendy Sultzman
HealthSouth Rehabilitation Hospital
Roger Tannen, EMT Paramedic
Bernalillo County Fire Department

John Udell
NM Trauma Foundation

Gunhild Vetter
Caregiver

Ron Voorhees, MD
NM Department of Health
Chief Medical Officer

APPENDIX B.

Model Predicts Increasing Stroke Rate for New Mexico: 2005-2025

Purpose: Predictions about the future burden of stroke morbidity must incorporate the dramatic changes in demography expected to occur in the coming decades. We sought to create a predictive model for the total number of stroke patients in New Mexico using demographical characteristics. **Methods:** Stroke incidence rate for 2001 by zip codes was obtained from the NM Health Policy Commission. Demographic data and population trends by zip code were obtained from the U.S. Census Bureau. Using stepwise ordinary least squares regression, a model was generated to predict the total number of strokes in each zip code. This model was then used to predict future stroke incidence. **Results:** Of the 30 demographic and population variables tested, the final model retained the following variables (coefficients): Constant (-365.92), African-American (19.40), Asian (-28.79), Females age 60-69 (-27.22), Females age \geq 80 (28.37), and Males age \geq 80 (90.46). The model fit the historical data well (adjusted $R^2 = 0.96$). Application of the model to projected demographic trends through 2025 predicated that stroke incidence will increase at a rate 2.14 times greater than the rate of predicted population change.

Predicted Stroke Incidence					
Year	Population		Stroke		Stroke Change/ Pop Change
	Predicted (million)	Change	Predicted	Change	
2000	1.860		4549		
2005	2.016	8.39%	5347	17.54%	2.09
2010	2.155	6.89%	6308	17.97%	2.61
2015	2.300	6.73%	7242	14.81%	2.20
2020	2.454	6.70%	8108	11.96%	1.79
2025	2.612	6.44%	9163	13.01%	2.02
Average		7.03%		15.06%	2.14

Conclusions: Demographical characteristics result in a robust predictive model of stroke incidence. Due to an aging population and other demographical changes, this model predicts the total number of stroke patients in NM will rise more sharply than growth in total population.

APPENDIX C

Stroke Task Force

**Hospital Stroke Admissions
to New Mexico Acute Care Hospitals**

Addendum

**Calendar Years
2001 and 2002**

**Utilizing
New Mexico Health Policy Commission
Hospital Inpatient Discharge Data**

Prepared by

**John V. Udell, PhD,
Executive Director
New Mexico Trauma Foundation
June 2001**

**Stroke Task Force
Preliminary Findings
Hospital Stroke Admissions**

Clinical Information

Discussion

Depicted below are the stroke admissions to New Mexico acute care hospitals in 2001 and 2002. The admissions are divided into seven different categories. For each clinical category, the number of admissions, the percentage of stroke admissions represented by each category, the average length of stay (LOS), age and charges per admission.

Clinical Category	Number	%	Average LOS	Average Age	Average Charges
EMBOLUS/INTERCEREBRAL BLEED W OPERATION (OP)	286	3.66%	10	65	\$38,361
EMBOLUS/INTERCEREBRAL BLEED W/O OP	4,330	55.30%	6	73	16,626
TRANSIENT ISCHEMIA W OP	799	10.20%	3	72	17,596
TRANSIENT ISCHEMIA W/O OP	2,299	29.36%	4	72	11,923
SUBARACHNOID HEMORRAHAGE WITH VENTRICULOSTOMY	3	.04%	5	66	31,843
SUBARACHNOID HEMORRAHAGE W MULTIPLE OPS	29	.37%	12	48	64,217
SUBARACHNOID HEMORRAHAGE W/O OP	84	1.07%	5	64	18,206
Total	7,830	100.00 %	5	72	\$16,337

Stroke Admissions by Ascribed Clinical Capability of Admitting Hospital

Discussion

Depicted below are the stroke admissions divided into two type of hospitals, urban hospitals serving urban communities that have either neurological and/or neurosurgical clinical capability and hospitals serving rural communities with neither the neurological nor neurosurgical capability. The chart identifies the total number of stroke admissions and the number of admissions to either urban or rural for each clinical category as well as the percentage of the category admitted to either urban or rural hospitals,

Clinical Category	Number	URBAN	%	RURAL	%
EMBOLUS/INTERCEREBRAL BLEED W OPERATION (OP)	286	285	99.65%	1	.35%
EMBOLUS/INTERCEREBRAL BLEED W/O OP	4,330	3,005	69.40%	1,325	30.60%
TRANSIENT ISCHEMIA W OP	799	767	95.99%	32	4.01%
TRANSIENT ISCHEMIA W/O OP	2,299	1,643	71.47%	656	28.53%
SUBARACHNOID HEMORRAHAGE WITH VENTRICULOSTOMY	3	3	100.00%	0	0
SUBARACHNOID HEMORRAHAGE W MULTIPLE OPS	29	29	100.00%	0	0
SUBARACHNOID HEMORRAHAGE W/O OP	84	61	72.62%	23	27.38%
Total	7,830	5,793	73.98%	2,037	26.02%

Urban Communities

- Farmington
- Roswell
- Albuquerque
- Santa Fe
- Las Cruces

Rural

- All else

Stroke Admissions Albuquerque Acute Care Hospitals

Discussion

Depicted below are the stroke admissions to Albuquerque acute care hospitals all of which are assumed to either neurological and/or neurosurgical clinical capability. The chart identifies the total number of stroke admissions and the number of admissions to Albuquerque hospitals for each clinical category as well as the total percentage of the category admitted by the Albuquerque hospitals and the percentage of urban hospital admissions.

Clinical Category	Total Stroke Admissions	Albuquerque Hospitals Stroke Admissions	%of Total Stroke Admissions	% of urban Hospital Stroke Admissions
EMBOLUS/INTERCEREBRAL BLEED W OPERATION (OP)	286	202	70.63%	70.88%
EMBOLUS/INTERCEREBRAL BLEED W/O OP	4,330	2,307	53.28%	76.77%
TRANSIENT ISCHEMIA W OP	799	567	70.96%	73.92%
TRANSIENT ISCHEMIA W/O OP	2,299	1,315	57.20%	80.04%
SUBARACHNOID HEMORRAHAGE WITH VENTRICULOSTOMY	3	2	66.66%	66.66%
SUBARACHNOID HEMORRAHAGE W MULTIPLE OPS	29	29	100.00%	100.00%
SUBARACHNOID HEMORRAHAGE W/O OP	84	55	65.48%	90.16%
Total	7,830	4,477	57.18%	77.28%

Hospitals

- University of New Mexico Hospital
- Lovelace Medical Center
- Presbyterian Hospital
- Presbyterian Kaseman
- Albuquerque Regional MC
- West Mesa MC
- NE Heights MC

Average Charges per Admission

Clinical Category	Total Number	URBAN	RURAL
EMBOLUS/INTERCEREBRAL BLEED W OPERATION (OP)	\$38,361	\$38,204	\$82,871(one admission)
EMBOLUS/INTERCEREBRAL BLEED W/O OP	16,626	18,594	12,165
TRANSIENT ISCHEMIA W OP	17,596	17,633	16,751
TRANSIENT ISCHEMIA W/O OP	11,923	13,492	7,993
SUBARACHNOID HEMORRHAGE WITH VENTRICULOSTOMY	31,843	31,843	-
SUBARACHNOID HEMORRHAGE W MULTIPLE OPS	64,217	64,217	-
SUBARACHNOID HEMORRHAGE W/O OP	18,206	21,457	9,584
Total	\$16,337	\$18,250	\$10,898

Average Length of Stays

Clinical Category	Number	URBAN	RURAL
EMBOLUS/INTERCEREBRAL BLEED W OPERATION (OP)		10	15
EMBOLUS/INTERCEREBRAL BLEED W/O OP		6	6
TRANSIENT ISCHEMIA W OP		3	2
TRANSIENT ISCHEMIA W/O OP		4	3
SUBARACHNOID HEMORRHAGE WITH VENTRICULOSTOMY		5	-
SUBARACHNOID HEMORRHAGE W MULTIPLE OPS		12	-
SUBARACHNOID HEMORRHAGE W/O OP		6	4
Total		5	5

Financial Information

Depicted below are percentages of stroke admissions represented by each of the financial classifications for total stroke admissions and the relative percentages for urban and rural hospitals.

	Total Stroke Admissions	Urban Stroke Admissions	Rural Stroke Admissions
Financial Classification			
Medicare	71.05%	70.91%	77.50%
Medicaid	3.80%	3.73%	3.99%
Champus	1.53%	.46%	4.24%
IHS/PHS	.55%	.56%	.53%
Other Gov	.57%	.61%	.46%
Private Insurance	15.07%	15.26%	8.51%
Workers Comp	.10%	.14%	0
Self Pay	5.30%	5.94%	3.57%
Charity/Indigent	.74%	1.02%	0
Unknown	1.29%	1.37%	1.20%
Total	100.00%	100.00%	100.00%

The total estimated in-patient cost for Calendar Year 2002 was \$65,418,910.

APPENDIX D.

NEW MEXICO STROKE TASK FORCE PROVIDER SURVEY, 2004

Total responses: 63

1. Discipline:

Discipline	Number	%
Family Practitioner	1	2
Internal Medicine	40	65
Emergency Medicine	12	19
Cardiology	4	6
Other	5	8
Total	62	

2. My practice is located in _____ . (name of county)

Please see Appendix A: Provider Response Map

3. The closest referral center for acute stroke care is _____ . (name of center)

UNMH	22
St. Vincent	8
Albuquerque	5
MMC	3
Lovelace	2
Lubbock	2
Presbyterian	2
VA	2
ARMC	1
El Paso	1
ENMMc	1
Holy Cross	1
Las Cruces Medical Center	1
Northeast Heights or West Mesa	1
Presbyterian	1
RMCH, Gallup	1
Santa Fe	1

4. Stroke is a major concern in my patient population.

Strongly Agree	28	48.3%
Agree	20	34.5%
Neutral	6	10.3%
Disagree	2	3.4%
Strongly Disagree	2	3.4%
Total	58	100.0%

5. *I discuss the risk factors of stroke with my clients on a regular basis.*

Strongly Agree	15	25.9%
Agree	24	41.4%
Neutral	7	12.1%
Disagree	9	15.5%
Strongly Disagree	3	5.2%
Total	58	100.0%

6. *ID Patients*

Strongly Agree	11	19.6%
Agree	16	28.6%
Neutral	11	19.6%
Disagree	13	23.2%
Strongly Disagree	5	8.9%
Total	56	100.0%

7. *Which aspect of stroke risk management do you find most difficult to achieve in your patient population? 1-Not difficult 2- Difficult 3-Very Difficult*

Tobacco Use Cessation

Not Difficult	5	10.2%
Difficult	10	20.4%
Very Difficult	34	69.4%
Total	49	100.0%

Identification and control of high blood pressure

Not Difficult	22	45.8%
Difficult	20	41.7%
Very Difficult	6	12.5%
Total	48	100.0%

Weight control

Not Difficult	0	0.0%
Difficult	14	28.6%
Very Difficult	35	71.4%
Total	49	100.0%

Regular Physical Exercise

Not Difficult	0	0.0%
Difficult	27	58.7%
Very Difficult	19	41.3%
Total	46	100.0%

Diabetes Management

Not Difficult	9	19.1%
Difficult	27	57.4%
Very Difficult	11	23.4%
Total	47	100.0%

8. *I complete routine cholesterol screening on all my patients:*

At risk for stroke.

TRUE	43	74.1%
FALSE	15	25.9%
Total	58	100.0%

History of CAD

TRUE	44	75.9%
FALSE	14	24.1%
Total	58	100.0%

History of Diabetes

TRUE	44	75.9%
FALSE	14	24.1%
Total	58	100.0%

History of HTN

TRUE	43	74.1%
FALSE	15	25.9%
Total	58	100.0%

Family history of CAD

TRUE	38	65.5%
FALSE	20	34.5%
Total	58	100.0%

9.

10. *Do you modify risk factors for stroke by medical treatments such as:*
Select all that apply

Anticoagulants such as warfarin in clients with atrial fibrillation

Strongly Agree	44	83.0%
Agree	8	15.1%
Neutral	0	0.0%
Disagree	0	0.0%
Strongly Disagree	1	1.9%
Total	53	100.0%

Anti-clotting platelet agents such as aspirin in clients with cardiovascular or cerebrovascular disease

Strongly Agree	50	89.3%
Agree	5	8.9%
Neutral	1	1.8%
Disagree	0	0.0%
Strongly Disagree	0	0.0%
Total	56	100.0%

Cholesterol-lowering drugs

Strongly Agree	44	84.6%
Agree	7	13.5%
Neutral	1	1.9%
Disagree	0	0.0%
Strongly Disagree	0	0.0%
Total	52	100.0%

Anti-hypertensive agents

Strongly Agree	51	92.7%
Agree	4	7.3%
Neutral	0	0.0%
Disagree	0	0.0%
Strongly Disagree	0	0.0%
Total	55	100.0%

11. *I advise my patients at risk for stroke about the warning signs.*

Strongly Agree	13	23.6%
Agree	26	47.3%

Neutral	8	14.5%
Disagree	6	10.9%
Strongly Disagree	2	3.6%
Total	55	100.0%

12. *I advise my patients to call 911 if they experience any of the warning signs.*

Strongly Agree	18	34.6%
Agree	22	42.3%
Neutral	7	13.5%
Disagree	3	5.8%
Strongly Disagree	2	3.8%
Total	52	100.0%

13. *I am familiar with current guidelines for stroke treatment issued such as American Stroke Association/American Heart Association, the National Stroke Association and/or the American Academy of Neurology.*

Strongly Agree	17	29.8%
Agree	29	50.9%
Neutral	5	8.8%
Disagree	4	7.0%
Strongly Disagree	2	3.5%
Total	57	100.0%

14. *I am familiar with the current indication for the use of thrombolytic therapy (intravenous tPA) for acute ischemic stroke.*

Strongly Agree	22	38.6%
Agree	23	40.4%
Neutral	7	12.3%
Disagree	2	3.5%
Strongly Disagree	3	5.3%
Total	57	100.0%

15. *I have patients who have received thrombolytic therapy (intravenous tPA) for treatment of a stroke in an emergency setting.*

Strongly Agree	7	12.5%
Agree	10	17.9%
Neutral	14	25.0%
Disagree	14	25.0%
Strongly Disagree	11	19.6%

Total	56	100.0%
-------	----	--------

16. How many hours of education did you attend in the last 12 months concerning:

Stroke

0 hrs	22	37.9%
1-5 hrs	20	34.5%
6-10 hrs	13	22.4%
11+ hrs	3	5.2%
Total	58	100.0%

Cardiovascular disease

0 hrs	13	22.4%
1-5 hrs	5	8.6%
6-10 hrs	17	29.3%
11+ hrs	23	39.7%
Total	58	100.0%

17. I am familiar with the emergency management of acute stroke.

Strongly Agree	22	38.6%
Agree	26	45.6%
Neutral	6	10.5%
Disagree	1	1.8%
Strongly Disagree	2	3.5%
Total	57	100.0%

18. I am concerned about the emergency treatment for stroke including:

EMS/Transport Issues

Strongly Agree	23	41.8%
Agree	23	41.8%
Neutral	8	14.5%
Disagree	1	1.8%
Strongly Disagree	0	0.0%
Total	55	100.0%

Emergency Room Resources (such as ER Physicians etc..)

Strongly Agree	21	38.2%
----------------	----	-------

Agree	24	43.6%
Neutral	6	10.9%
Disagree	4	7.3%
Strongly Disagree	0	0.0%
Total	55	100.0%

Hospital Resources (such as CT Scanner, Radiologist to read the CT scan, Neurology consult etc...)

Strongly Agree	23	42.6%
Agree	20	37.0%
Neutral	5	9.3%
Disagree	5	9.3%
Strongly Disagree	1	1.9%
Total	54	100.0%

19. *What is the best mechanism for you to keep updated on stroke treatment and resources? Please rank order the following: 1 = most important, 7= least important*

	AvgScore
Ability to contact stroke specialist	1.67
Printed CME	2.00
Regional/National Professional Meetings	2.31
Web CME	2.76
Local Grand Rounds	2.91
Computer CME	3.14
AudioTape	3.34

20. *What do you wish was available to assist in risk reduction of stroke?*

<p>Good information & social awareness for pt. On importance of elimination/alteration of risk factors for stroke.</p> <p>"Magic Pill"</p> <p>Anti-obesity Legislation</p> <p>Awareness in the pt.</p> <p>Better Pt. Compliance, Improve understanding of current issues</p> <p>Better Pt. Motivation, Public education</p> <p>Better treatment</p> <p>CME</p> <p>Community Ed.</p> <p>Community Education</p> <p>Education of the Public</p> <p>Education that starts early in pts. Course of TX</p> <p>Effective health education</p> <p>Less ER waiting time. Pt. Ed. To arrive at ER sooner</p> <p>Media Education of the Public</p> <p>Money for cessation programs</p> <p>More availability & enrollment of pt. Into primary care.</p>
--

More community emphasis on preventive medicine: exercise/diet ed., tobacco cessation programs
More education of pt.
More help with weight loss & diet
Neurologist willing to give tPA
Pt. Compliance
Pt. Education
Public Radio & TV Ed.
Smoking & Exercise
Smoking & Weight
Smoking Cessation
Smoking cessation and Weight loss
Smoking cessation resources, financial assistance
Smoking Cessation, weight loss, exercise programs
TV ads
Universal Health Coverage
Weight loss pill that was safe.

21. What do you wish was available to assist in the treatment and long-term management of stroke?

24 Hr. availability to contact consultant for advise who would also be available to transfer pt.
A stroke center willing to always take transfers.
Acute management units, more neurologist support, specific rehab.
Angioplasty
Assistance with PT
Better initial treatment
Better Pt. Access to out pt. Clinics, esp. neurology
Better rehabilitation funding/facilities.
Better set-up & availability of physical therapy, meds.
Better treatment
Coordinated LARG
Dedicated stroke protocols & Specialized ER services, rapid neural consult
Faster neurology evaluations
Inexpensive Rehab. For all
Money for prevention
More Neurologists
More rehab. Options
More rehabs
National Health Care
Neurologist
Prevention when applicable
Protocols tPA
Protocols, as there are for acute MI management.
Quick ER evaluation of CVA
Rehab
Reimbursement for PT & Home remodel
Safer thrombolytics

Stroke center devoted to CVA
Universal Health Coverage

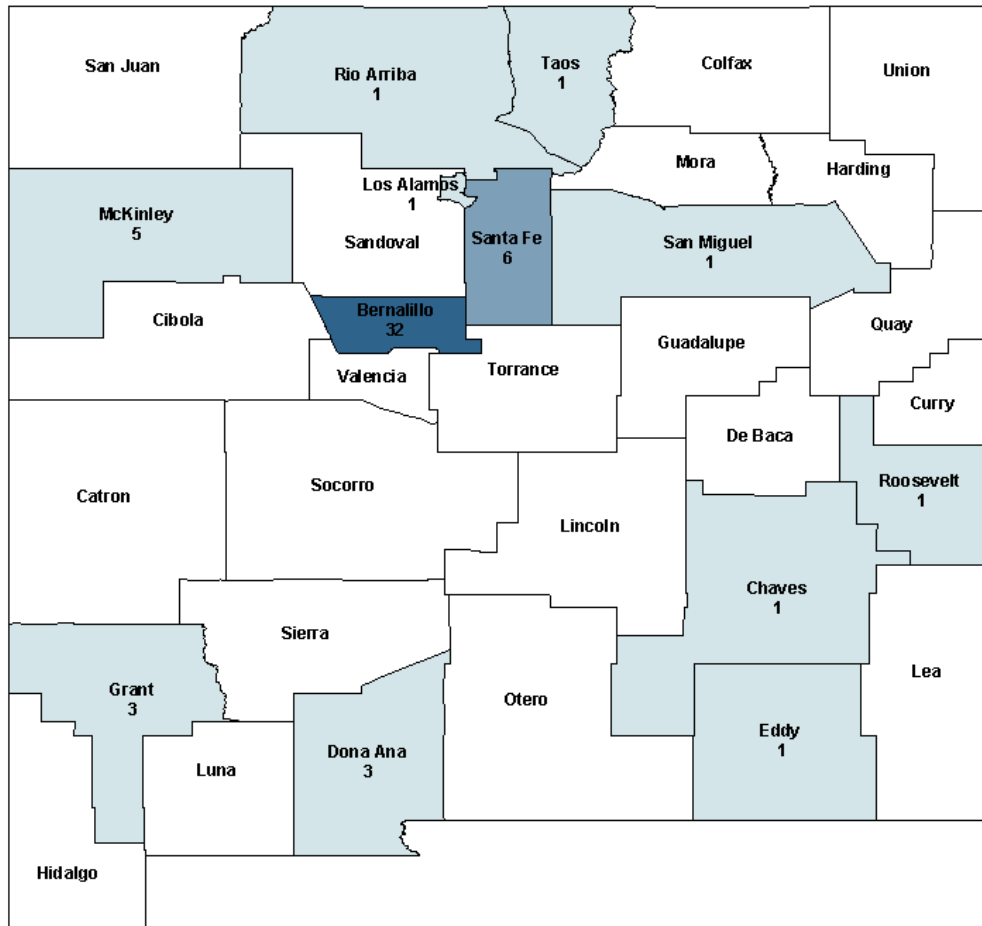
22. As a provider, what are your educational needs related to stroke and cardiovascular disease?

6 mo. Updates on stroke treatment
ACLS
articles
As above
CME
Computer CD ROM CME
Continued up-to-date internet resources regarding treatment guidelines.
Critical review of literature.
Currently adequately addressed
Keep current. Attend ACC every year
Keep up with current guidelines. Neurologists take all strokes at UNM, decreasing my exposure.
Knowing signs & symptom of acute stroke & a treatment guideline
Local Grand Rounds of Current Therapy
Local Networking
lots
More information on controlling risk factors.
None
Pamphlets
Public Awareness
Published studies, Consensus statements
Regular local CME programs
Regular Printed Updates
Regular updates on studies.
Review Articles
Strategies to reduce risk factors
Time to read
Up to date info
Update on Meds.

Update on meds.
Updates on management issues

Provider Survey Response

2004 Stroke Survey Provider Participants by County



New Mexico Counties

Legend

Number of Providers

1 - 5

6 - 10

11 or more

APPENDIX E.

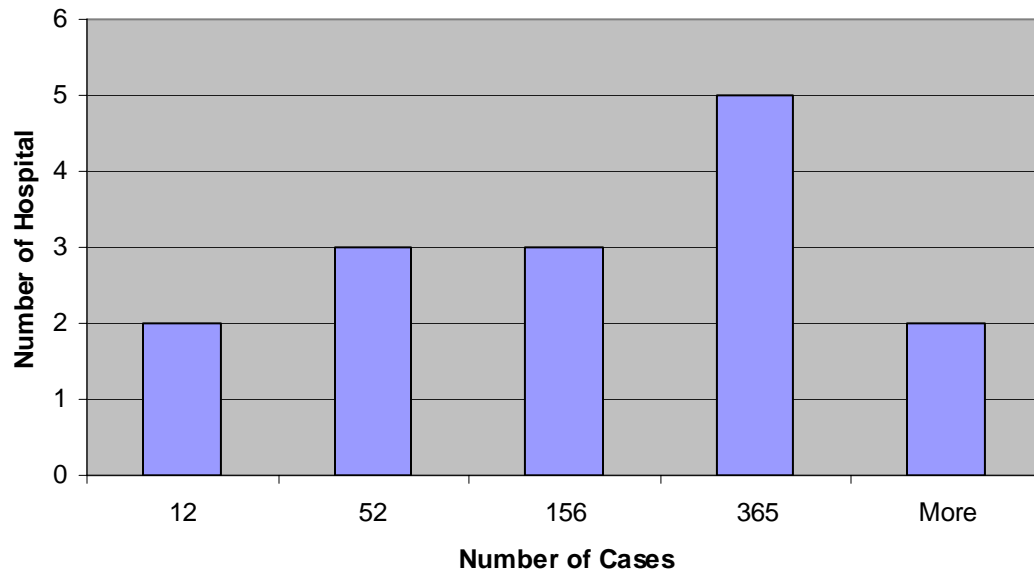
NEW MEXICO STROKE TASK FORCE HOSPITAL SURVEY, 2004

Overall Response rate: 58% (23/40)

1. Number of inpatient strokes and TIA (transient ischemic attacks) seen in 2003:(include ICD9 codes 430-437) _____

Response rate	61% (14/23)
Average	170
Total	2374
Min	4
Max	620

Survey results		
	Bin	Frequency
Once a month or less	0-12	2
Once a week or less	13-52	3
Three per week or less	53-156	3
Once a day or less	157-365	5
More than one per day	More	2



2. *Our hospital treats acute stroke as a medical emergency.*

Response	Count	%
1 = Strongly Agree	13	82
2 = Agree	5	
3 = Neutral	3	18
4 = Disagree	1	
5 = Strongly Disagree	0	
Total	22	

3. *Do EMS providers notify receiving hospitals of potential stroke patients similar to the method for beginning a 'trauma alert' that will activate a stroke protocol of the hospital?*

Response	Count	%
1 = Strongly Agree	3	41
2 = Agree	6	
3 = Neutral	3	59
4 = Disagree	6	
5 = Strongly Disagree	4	
Total	22	

4. *Our hospital has standing orders/clinical pathways for stroke.*

Response	Count	%
1 = Strongly Agree	3	32
2 = Agree	4	
3 = Neutral	4	68
4 = Disagree	8	
5 = Strongly Disagree	3	
Total	22	

5. *Our orders include the use of thrombolytic therapy such as intravenous tPA.*

Response	Count	%
1 = Strongly Agree	5	38
2 = Agree	3	
3 = Neutral	3	62
4 = Disagree	5	
5 = Strongly Disagree	5	
Total	21	

6. *We track the time for treatment with tPA.*

a. *Door to physician visit?*

Response	Count	%
<i>Yes</i>	13	68
<i>No</i>	6	32
Total	19	

b. *Door to CT scan read?*

Response	Count	%
<i>Yes</i>	4	22
<i>No</i>	14	78
Total	18	

c. *Door to treatment with tPA?*

Response	Count	%
<i>Yes</i>	10	50
<i>No</i>	10	50
Total	20	

7. *Would your institution be interested in available resources to establish a stroke protocol?*

Response	Count	%
<i>Yes</i>	18	82
<i>No</i>	4	18
Total	22	

8. *Would your institution like additional information on tPA usage?*

Response	Count	%
<i>Yes</i>	15	68
<i>No</i>	7	32
Total	22	

9. Does your hospital have 24 hour, seven days a week access to:

		<i>On-site 24hr/day</i>		<i>On-call 24hr/day</i>		<i>Avail. by transfer</i>		<i>Tele-medicine</i>	
		<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
<i>a</i>	<i>Neurologists, neurosurgeon, or physician experienced in stroke mgmt.</i>	1	12	6	10	14	0	3	9
		7.7%	92.3%	37.5%	62.5%	100.0%	0.0%	25.0%	75.0%
<i>b</i>	<i>CT scanning</i>	13	5	8	2	6	1	2	6
		72.2%	27.8%	80.0%	20.0%	85.7%	14.3%	25.0%	75.0%
<i>c</i>	<i>Pharmacy (someone to mix tPA)</i>	12	8	10	1	4	1	0	5
		60.0%	40.0%	90.9%	9.1%	80.0%	20.0%	0.0%	100.0%
<i>d</i>	<i>Staff skilled in intensive monitoring of tPA patients</i>	18	2	5	2	5	0	2	14
		90.0%	10.0%	71.4%	28.6%	100.0%	0.0%	12.5%	87.5%
<i>e</i>	<i>Cerebral angiography (physicians trained in intrarterial clot lysis)</i>	2	14	4	10	12	2	1	9
		12.5%	87.5%	28.6%	71.4%	85.7%	14.3%	10.0%	90.0%

10. Does your hospital have a case management department?

Response	Count	%
<i>Yes</i>	18	82
<i>No</i>	4	18
Total	22	

11. If yes, does your case management department have written criteria for the next level of care for a stroke patient?

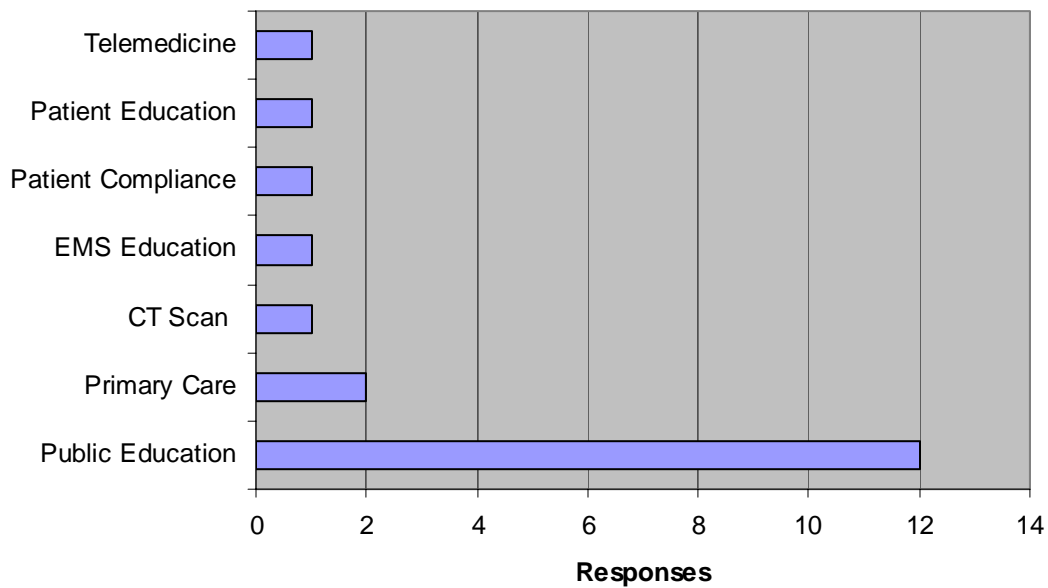
Response	Count	%
<i>Yes</i>	7	39
<i>No</i>	11	61
Total	18	

**12. What is the best mechanism for you to keep updated on stroke treatment and resources?
Please rank order the following: (1 = most important, 7= least important)**

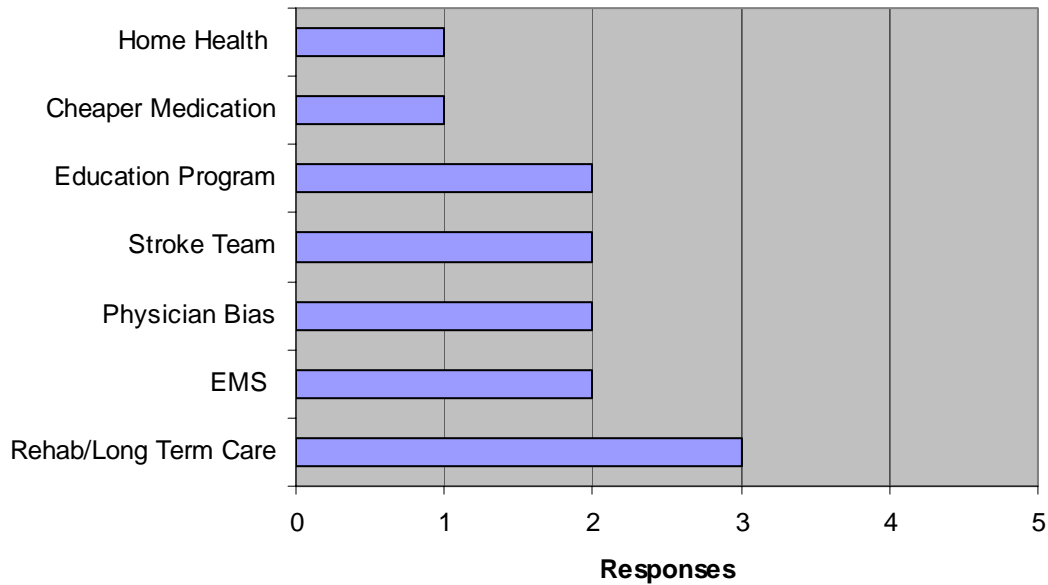
Items are placed in ascending order by their average numerical ranking score.

Item	Avg Rank
<i>Printed CME Material</i>	2.0
<i>Web based CME</i>	3.7
<i>Regional/National Professional Meetings</i>	3.9
<i>Ability to contact a stroke specialist</i>	3.9
<i>Independent Computer Based CME (CD ROM)</i>	4.1
<i>Audio tape</i>	4.9
<i>Local grand rounds type presentations</i>	4.9

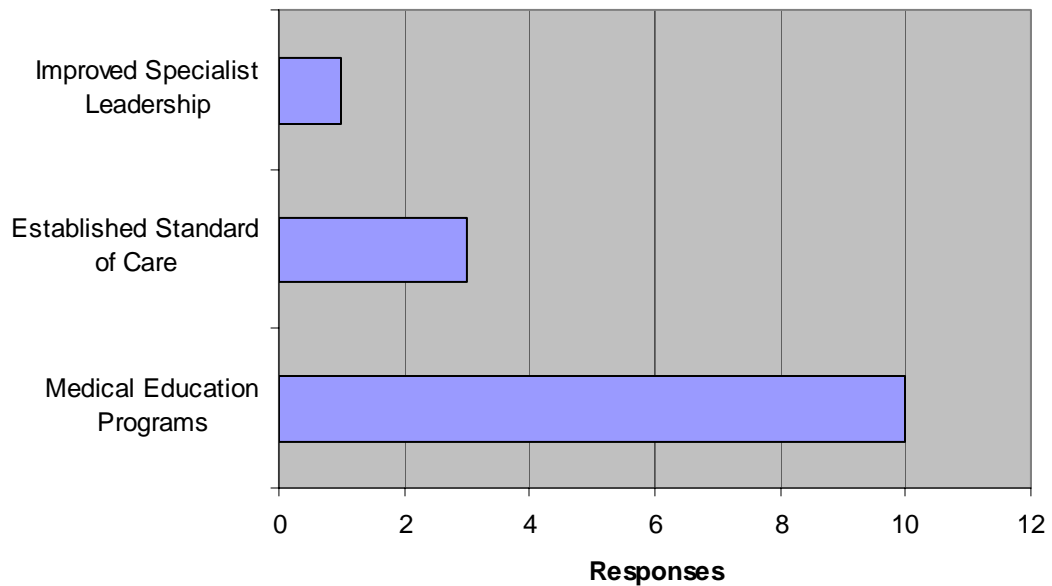
13. What do you wish was available to assist in risk reduction of stroke?



14. What do you wish was available to assist in the treatment and long-term management of stroke?



15. What are your educational needs related to stroke and cardiovascular disease? What are your educational needs related to stroke and cardiovascular disease?



APPENDIX F.

**NEW MEXICO STROKE TASK FORCE
STROKE SURVIVOR SURVEY, 2004
PATIENT SURVEY**

Total surveys returned: 134

1. This survey is being completed by:

Completed by	Count	Percentage
Survivor	58	43%
Caretaker	42	31%
Both Survivor and Caretaker	32	24%
No Answer	2	1%

2. How long ago did the stroke occur?

When Stroke Occurred	Count	Percentage
< 6 mo.	3	2%
6 months to 1 year	1	1%
1-3 Years	42	31%
Over 3 Years	85	63%
No Answer	3	2%

3. I was prepared after discharge to care for myself or if you are a caregiver, to care for the stroke survivor.

Prepared to Care for Self or Patient	Count	Percentage
1 = Strongly Agree	17	13%
2 = Agree	42	31%
3 = Neutral	19	14%
4 = Disagree	21	16%
5 = Strongly Disagree	28	21%
No Answer	7	5%

4. Prior to the stroke I was educated on the signs and symptoms of a stroke.

Was Educated about Stroke	Count	Percentage
1 = Strongly Agree	7	5%
2 = Agree	19	14%
3 = Neutral	19	14%
4 = Disagree	27	20%
5 = Strongly Disagree	55	41%
No Answer	7	5%

5. Please rate the importance of the following needs after discharge.

	Very Important	Important	Neither Import. nor Unimport.	Unimportant	Very Unimportant	No Answer
Emotional Support	107	21	1	1	0	4
	80%	16%	1%	1%	0%	3%
	96%					
Physical Therapy	113	13	4	2	0	2
	84%	10%	3%	1%	0%	1%
	94%					
Speech Therapy	106	15	5	2	2	4
	79%	11%	4%	1%	1%	3%
	90%					
Transportation	92	21	7	3	3	8
	69%	16%	5%	2%	2%	6%
	85%					
Equipment	74	30	10	5	4	11
	55%	22%	7%	4%	3%	8%
	77%					
In-Home Care Personnel	71	30	15	4	7	7
	53%	22%	11%	3%	5%	5%
	75%					
Financial Aid	69	30	17	5	6	7
	51%	22%	13%	4%	4%	5%
	73%					
Caregiver Relief Time	68	30	16	5	7	8
	51%	22%	12%	4%	5%	6%
	73%					
Home Remodel/ Adjustments	52	34	17	11	10	10
	39%	25%	13%	8%	7%	7%
	64%					

The following were entered as “Other” important needs following discharge:

Wife, Food Stamps if possible, Support Groups, Extended Therapy, Caregiver for errands and personal care, Occupational Therapy, Family members, Cleaning assistance, Occupational & Socialization Therapy, Education, Friends, Recreation & support for reentry in community participation, Physical, Occupational & Speech Therapy that insurance will not cover, Legal advice for financial, marital etc. issues, Disability aid, Attendant care (2), Therapy for swallowing, Early Hospice, Stroke Club, Train caregivers on importance of the above, Caring primary care physician, Caring people, Having Money, Join Stroke Club, Care should be customized, Ways to occupy time, No Support from Medicaid, Insurance makes nurse's aide possible, Therapy and support are a way of life, Knowing what is needed in the home prior to discharge.

6. If money were available to support stroke survivors, what would be a good way to spend it?

	Very Important	Important	Neither Import. nor Unimport.	Unimportant	Very Unimportant	No Answer
Education on stroke issues	71	43	8	0	2	10
	53%	32%	6%	0%	1%	7%
	85%					
Stroke support groups	62	43	14	2	3	10
	46%	32%	10%	1%	2%	7%
	78%					
Loans (non interest) for stroke survivors	61	31	17	4	2	19
	46%	23%	13%	3%	1%	14%
	69%					
Home Services	58	34	7	1	4	30
	43%	25%	5%	1%	3%	22%
	68%					

The following were entered as “Other” good ways to spend available money:

Brain Research, More Speech Therapy, Financial aid, Stool for car, adaptability classes for driving, Extended Therapy, Personal care, Additional Therapy, Physical & Speech Therapy, Additional Physical Therapy, Long term therapy & treatments, spiritual support, treatment while pt. waits for social security to approve disability payments, Speech therapy, Education, Speech therapy, Loans for (education for) those who can reenter the work force, Massage Therapists, Insurance to cover additional Physical Therapy, Transportation to services, Outings

& Classes in art, exercise, cooking, Transportation, NM Dept. of Health & Human Services helps this pt., Future options, Caregiver Relief, Caregiver Relief Time, Caregiver relief time & transportation, Help with Medication, Transportation, Competent rehab. Personnel, Need more research, medical check ups, tests, Minimum paperwork & flexible funding, Grants for brain problem, More therapy, the Alb. Stroke Club provides Support and Education, Gov't services, More outpatient therapy, Exercise & hobby classes for disabled

7. After your stroke, did you experience:

	No	Yes	No Answer
Loss of Home	103	14	17
	77%	10%	13%
Loss of Vehicle	79	37	18
	59%	28%	13%
Loss of Job	67	44	23
	50%	33%	17%

The following were entered as “Other” losses following stroke:

I am retired and have a very caring husband, We need laws forcing health Insurance Co. to provide B.P. Meds. HDL,LDL Meds, Was unable to work due to speech problems, With husband in nursing home, I can't afford food & I am on O2 so can't work, Loss of Speech, Couldn't drive, retired, Loss of memory, sensation, concept of time, Was out of the work force too long so lost job, Loss of Spousal Support, Loss of self esteem. Lonely, Loss or Mobility and Independence, Loss of Speech, trapped inside, Loss of self identity, Husband retired early to be caregiver, Independence, Loss of Memory & Thought processes, Have part time job, but need full time to support myself, Loss of spouse. Became single parent with a 3 year old. Family is biggest support, Retired, Loss of independence & relationships. Others didn't know how to treat her & she felt ignored, Left hand and leg, Divorce, APS gave him a job he couldn't do & then fired him, Was able to go back to work after 6 months, Independence, Loss of personal possessions. Sold possessions to avoid bankruptcy, Concerned about the cost of drugs and residential care, After stroke follow-up & family support is critical (this pt. was over medicated and died.), Loss of income, Delayed loss of job, Lost ability to drive, Caregiver had to quit job, Reading - Would like to have help learning to read again, Physical, Psychological, (depression), Lost quality of life as we knew it before stroke, Lost Independence, Lost job within one year, Lost friends because we lost common activities, Loss of life, Lost speech & have aphasia, Lost brain and physical function, I lost everything that I had. I received no state aid, Unable to use phone, Had to sell one vehicle, Caregiver had to get a job, Now home bound, May lose job, Independence, Drivers License, Divorce, Lost friends

APPENDIX G.

Los Angeles Stroke Scale

Los Angeles Prehospital Stroke Scale

<i>Criteria</i>	<i>Yes</i>	<i>Unknown</i>	<i>No</i>
1 Age > 45	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 No history of seizures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Symptoms < 24 hrs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Not wheelchair-bound or bedridden at baseline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Glucose 60–400 mg/dL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assess symmetry in facial movement, handgrip, or arm strength			
	<i>Normal</i>	<i>Right</i>	<i>Left</i>
Facial smile/grimace	<input type="checkbox"/>	<input type="checkbox"/> Droop	<input type="checkbox"/> Droop
Grip	<input type="checkbox"/>	<input type="checkbox"/> Weak <input type="checkbox"/> None	<input type="checkbox"/> Weak <input type="checkbox"/> None
Arm strength	<input type="checkbox"/>	<input type="checkbox"/> Drifts down <input type="checkbox"/> Falls rapidly	<input type="checkbox"/> Drifts down <input type="checkbox"/> Falls rapidly
		<i>Yes</i>	<i>No</i>
6 Based on exam, patient has only unilateral weakness		<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX H.

Helicopter Transport from Scene Improve Access to Stroke Care

Purpose: Helicopter transport has been advocated as a method to improve access to care and decrease total out-of-hospital time (OHT) for various emergencies, including acute stroke. We sought to determine the impact on access to care using a helicopter to transport patients directly from the scene to potential stroke referral centers in New Mexico. **Methods:** GIS software was used to model system performance under various configurations. The model used NM stroke incidence rates, US Census Bureau demographic data, NM specific EMS performance data, as well as response time regression models for ground and helicopter ambulances. The percentage of state population and 2001 stroke patients within 60 and 90 minutes of stroke referral centers was determined. This baseline system was compared to alternative systems that would use existing helicopters to transport patients from the scene using standard dispatch policies (average delay of 13 minutes after ground dispatch) as well as simultaneous air and ground ambulance dispatch. **Results:** System performance averages included: ground response time 9 min (\pm 8), ground scene time 16 min (\pm 12), air ambulance launch time 9 min (\pm 6), and air ambulance scene time 19 min (\pm 10). For standard air ambulance dispatch, ground transport was faster for all patients within the 60 minute OHT standard. Results for other configurations are shown below:

Model	Description		% Total Pop	% Total Strokes
1	60 min OHT, simultaneous air dispatch	Ground	50.1	48.2
		Ground + Air	54.8	51.2
		Improvement	4.7	3.0
2	90 min OHT, standard air dispatch	Ground	65.8	60.7
		Ground + Air	72.4	67.4
		Improvement	6.6	6.8
3	90 min OHT, simultaneous air dispatch	Ground	65.8	60.7
		Ground + Air	77.6	71.7
		Improvement	11.8	11.1

Conclusion: Air ambulance scene response using standard dispatch procedures for acute stroke did not increase access to stroke referral centers within 60 minutes. Utilizing simultaneous air and ground ambulance dispatch did demonstrate potential for increased access at both 60 and 90 minutes.

APPENDIX I.

Impact of Expanding Stroke Care Centers in New Mexico

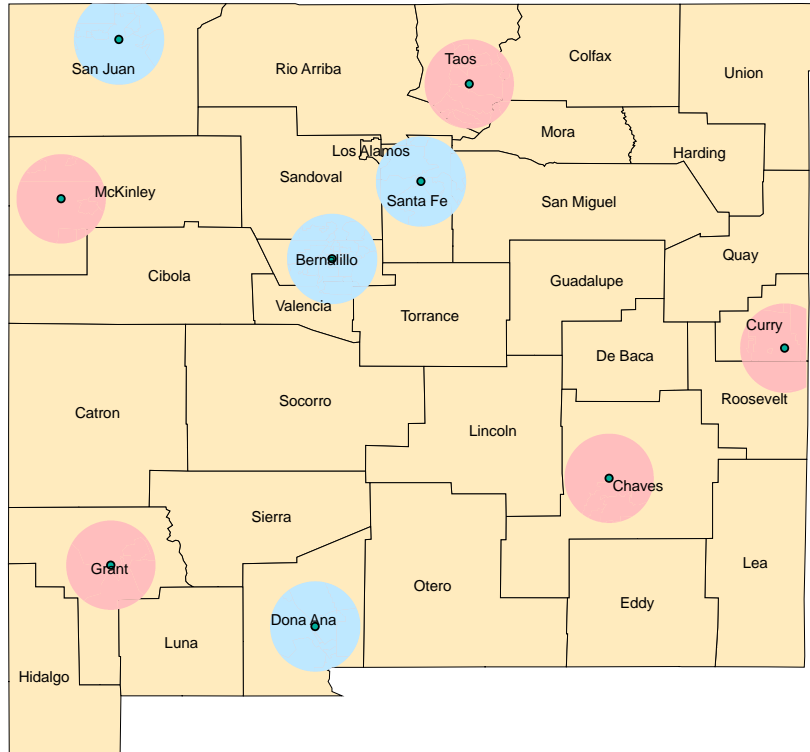
Purpose: A survey conducted in 2004 of New Mexico hospitals by the New Mexico Stroke Task Force identified nine hospitals in four geographical areas (Farmington, Santa Fe, Albuquerque, and Las Cruces) with the capacity to be designated as “Stroke Centers” based upon their ability to provide acute stroke care. The Task Force also identified five additional areas (Taos, Gallup, Silver City, Clovis, and Ruidoso), each with one hospital, as critical access points for acute stroke care based upon clinical capacity and geographical location. We sought to determine the impact of these five critical access points on access to acute stroke care. **Methods:** GIS software was used to model access to care and to estimate the percentage of state population and stroke patients within 60 minutes of a stroke referral center utilizing a ground ambulance for transportation. The baseline system of four stroke referral areas was compared to an expanded system that also incorporated the five critical access areas. The model used 2001 NM stroke incidence rates, 2001 US Census Bureau demographic data, NM specific EMS performance data. A regression model was created to estimate transport time from the scene to the receiving facility. The 60 minute total out of hospital time included all time intervals from receipt of 911 call to arrival at the health care facility by ambulance. **Results:** System performance averages in the model included ground response time of 9 min (± 8) and ground scene time of 16 min (± 12). The scene to facility transport time regression model R squared value was 0.80 with an intercept of 3.83 min and coefficient of 1.03 minutes per mile. Results of the comparisons are shown below:

60 Minute Total Out of Hospital Time - Ground EMS Only

Configuration	Area		Pop 2001		Strokes 2001	
	Sq. Miles	% Total	N	% Total	N	% Total
4 Stroke Care Areas	5,614	4.62%	921,767	50.12%	2,170	48.25%
9 Stroke Care Areas	12,206	10.04%	1,087,796	59.15%	2,572	57.19%
Absolute Improvement	6,592	5.43%	166,029	9.03%	402	8.94%
Relative Improvement		117.42%		18.01%		18.53%

Conclusion: Fifty percent of the NM population resides within 60 minutes of a potential stroke center by ground EMS. Expanding the acute stroke care by an additional five facilities improved the percentage of the population within the 60 minutes access parameter by an absolute value of 9%.

Geographical Areas within 60 Minutes of Potental Stroke Care Facilites



Legend

- Hospitals
- Original Stroke Center Areas
- Expanded Stroke Cneter Areas

**New Mexico Stroke Task Force
2004**