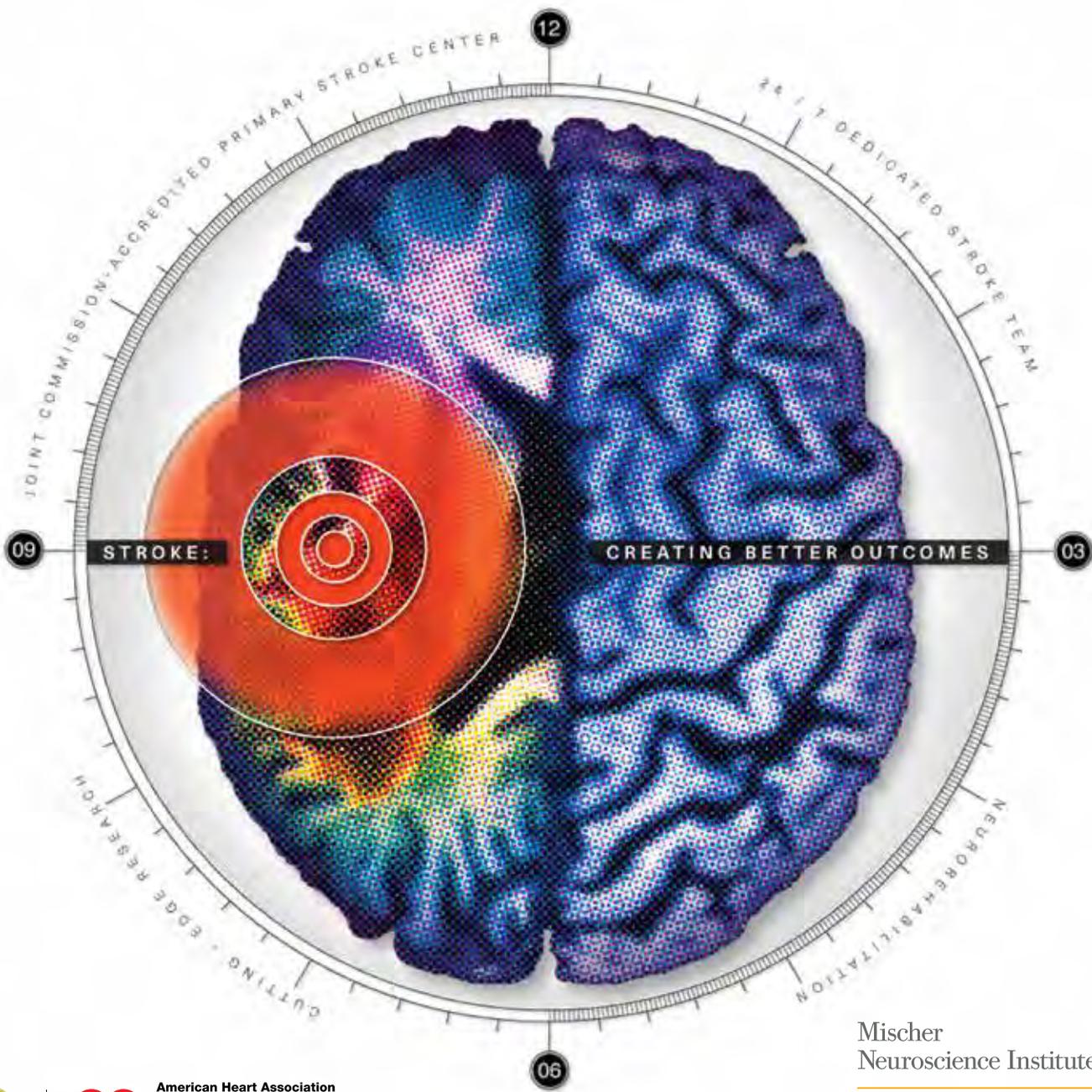


MEMORIAL HERMANN  
MISCHER NEUROSCIENCE INSTITUTE  
**STROKE**  
**EDUCATION**  
— TEXAS MEDICAL CENTER —



American Heart Association  
American Stroke Association  
**CERTIFICATION**  
Meets standards for  
**Comprehensive Stroke Center**

Mischer  
Neuroscience Institute

**MEMORIAL**  
**HERMANN**

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# Introduction

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FEW DISEASES ARE AS DEBILITATING TO BOTH PATIENTS AND FAMILIES AS A STROKE. TODAY, HOWEVER, REMARKABLE PROGRESS HAS BEEN MADE IN THE TREATMENT AND REHABILITATION OF PATIENTS WHO HAVE HAD A STROKE.

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**T**he multidisciplinary team at the Mischer Neuroscience Institute (MNI) at Memorial Hermann-Texas Medical Center has developed a comprehensive, coordinated program for the care of stroke patients or for those at high risk. The MNI is also the first in Texas to receive the Comprehensive Stroke Center Certification by The Joint Commission and the American Heart Association/American Stroke Association. The certification recognizes hospitals that have state-of-the-art infrastructure, staff and training to receive and treat patients with the most complex strokes.

In addition to the personalized care that you receive at MNI, please refer to this booklet as you or your family member navigates the journey to recovery. In addition to learning about key milestones and expectations of stroke patients, you will find important resources, clinical details and helpful suggestions for rehabilitation.

We look forward to answering your questions and traveling the road to recovery with you. Please feel free to ask our stroke team members any questions about your treatment or rehabilitation. We aim to be your partner as together we help you or your family member recover from stroke.

## **THE FOLLOWING PAGES INCLUDE:**

- **Common signs and symptoms of a stroke**
- **Details about discharge and life after treatment**
- **Risk factors that you can control**
- **Proper use of stroke medications**



# What Is a Stroke?

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IN THE SAME WAY THAT A PERSON SUFFERING A LOSS OF BLOOD TO THE HEART SUFFERS A HEART ATTACK, A PERSON WITH A LACK OF BLOOD FLOW TO THE BRAIN SUFFERS A STROKE. ACCORDING TO THE AMERICAN STROKE ASSOCIATION, APPROXIMATELY 795,000 AMERICANS SUFFER A STROKE EACH YEAR, WHICH MEANS, ON AVERAGE, A STROKE OCCURS EVERY 40 SECONDS. FOR THIS REASON, IT IS IMPORTANT TO UNDERSTAND THE RISK FACTORS FOR STROKE, AS WELL AS COMMON WARNING SIGNALS THAT A STROKE IS IMMINENT OR UNDER WAY.

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**O**ften, the signs of a stroke are physical, with affected individuals experiencing an inability to speak or move arms or legs. Occasionally, a stroke can cause changes in behavior, mood, thought patterns and memory.

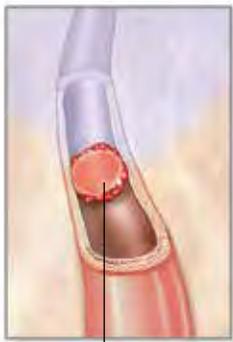
**Strokes can occur in people of all ages.** However, since most strokes occur as a result of degenerative changes in the body's blood vessels, the chance of having a stroke increases with age. Approximately 70 percent of all strokes occur in people over the age of 65, with the risk for stroke doubling each decade after 55. As with a heart attack, the prognosis for stroke patients is much better the sooner they receive medical attention.

Stroke refers to brain damage due to blockage or rupture of blood vessels feeding the brain. When a stroke occurs, brain cells die or are impaired. Since the brain controls everything in the body, a stroke in a certain area of the brain can affect the primary function controlled by the damaged area.

# Types of Stroke

THE TWO MAJOR TYPES OF STROKE ARE ISCHEMIC AND HEMORRHAGIC. STROKES CAN CAUSE DIFFERENT SHORT- AND LONG-TERM EFFECTS IN PATIENTS, DEPENDING ON THE SIDE OF THE BRAIN AFFECTED BY BLOOD LOSS, AS WELL AS THE PORTION OF THE BRAIN IN WHICH A BLOCKAGE OR BLEEDING OCCURS.

## Ischemic Stroke



Embolism  
(blood clot)

Dead brain tissue due to lack of blood supply



## Hemorrhagic Stroke



Rupture

Dead brain tissue due to rupture of blood vessels



## Ischemic Stroke

An ischemic stroke occurs when an obstruction blocks the normal flow of blood in an artery that feeds the surface and underlying portions of the brain. **Ischemic strokes comprise approximately 87 percent of all strokes.** Two types of blockages can occur with ischemic stroke: cerebral thrombosis, or a blood clot that forms at the obstructed vessel, and a cerebral embolism, which is a blood clot that forms elsewhere in the circulatory system, breaks free and travels to the brain.

## Hemorrhagic Stroke

Hemorrhagic strokes occur when blood vessels in the brain rupture. **Hemorrhagic strokes account for approximately 13 percent of all strokes.** Bleeding can occur from many conditions that affect the blood vessels, including high blood pressure, build up of abnormal proteins (amyloid) in the brain and weak spots in the blood vessel walls (aneurysm). A less common cause for bleeding is arteriovenous malformations (AVMs).

An aneurysm occurs when an artery in the brain forms a balloon, which can rupture and cause bleeding if left untreated. With AVMs, arteries or veins in the brain may be deformed and can lead to eventual rupture.

Hemorrhagic strokes can happen in different compartments of the brain. There are two types of brain hemorrhage:

- Intracerebral hemorrhage refers to actual bleeding within the brain.
- Subarachnoid hemorrhage occurs when a damaged blood vessel causes blood to accumulate at the surface of the brain. This type of hemorrhage can cause an immediate headache and can interfere with brain function, as well as cause artery spasms that can damage brain tissue.

### Transient Ischemic Attack (TIA)

A TIA is a temporary clot and is referred to as a “mini-stroke,” as its warning signs are identical to stroke, but it does not cause permanent injury to the brain. However, TIA is a serious condition that should be treated immediately to ward off subsequent strokes. **According to the American Stroke Association, roughly one third of people who experience a TIA suffer a stroke within a year.**

### Right Brain (Hemisphere) Stroke

A stroke in the right hemisphere can cause paralysis or weakness on the left side of the body, a condition known as left hemiplegia. Survivors of right hemisphere strokes often experience judgment and behavioral problems, such as difficulty determining distance, size or speed, as well as impulsivity. They also may experience left-side neglect, or the tendency to ignore or forget objects or people on their left side. Some survivors of right hemisphere stroke may experience problems with short-term memory, while long-term memories remain intact.

### Left Brain (Hemisphere) Stroke

As the left hemisphere of the brain controls the right side of the body, survivors of left hemisphere stroke may have paralysis or weakness on the right side of the body, known as right hemiplegia. The left side of the brain also controls language abilities, and therefore strokes that occur in this hemisphere often cause aphasia, or a wide range of speech and language problems. Strokes in this region of the brain generally have highly individualistic repercussions. For example, one patient may have difficulty communicating because he or she cannot move muscles

needed to speak properly, but remain completely unimpaired in the skills needed to read, write or understand speech.

Survivors of left hemisphere stroke often develop a slow and cautious behavioral style and may need frequent instruction and encouragement to complete tasks. They also may develop memory problems similar to right hemisphere stroke patients, including difficulty learning new information and problems conceptualizing and generalizing details.

### Cerebellar Stroke

The cerebellum controls many reflexes, as well as balance and coordination. A stroke in this region of the brain can cause abnormal reflexes of the head and torso, as well as dizziness, nausea and vomiting.

### Brain Stem Stroke

Strokes that occur in the brain stem can be especially devastating. This region of the brain controls all involuntary functions that support life, including one’s breathing rate, blood pressure and heartbeat. The brain stem also controls eye movements, hearing, speech and swallowing. Because impulses generated in the brain’s hemispheres must travel through the brain stem to reach the arms and legs, patients with brain stem stroke may develop weakness or paralysis in one or both sides of the body.

### Basal Ganglia Stroke

The basal ganglia serve as “messengers” in the middle of the brain and sort out information for the spinal cord and cerebellum. Many types of stroke can affect the basal ganglia, which in turn can impede body movement and sensation, vision, judgment, motivation, personality and speech.



# Signs and Symptoms

RECOGNIZING STROKE IS THE FIRST IMPORTANT STEP IN GETTING THE TREATMENT YOU NEED. THE NATIONAL STROKE ASSOCIATION RECOMMENDS THE ACRONYM “FAST” AS A HELPFUL TOOL IN RECOGNIZING AND RESPONDING TO STROKE.

## Signs and symptoms may include:

- Sudden weakness or numbness in the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding others
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headaches with no known cause

If any of these signs and symptoms occurs, act “FAST” and dial 9-1-1

### **F = Face**

Ask the person to smile. Does the smile look normal?

### **A = Arm**

Ask the person to raise both arms. Does one drift downward?

### **S = Speech**

Ask the person to repeat a simple phrase. Does the speech sound slurred or strange?

### **T = Time**

If you see any of these signs, call 9-1-1 immediately.



# Risk Factors for Stroke

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THE AMERICAN HEART ASSOCIATION HAS IDENTIFIED SEVERAL FACTORS THAT INCREASE THE RISK OF STROKE. THE MORE RISK FACTORS A PERSON HAS, THE GREATER THE CHANCE THAT HE OR SHE WILL EXPERIENCE A STROKE. WHILE SOME RISK FACTORS ARE UNCONTROLLABLE, SUCH AS INCREASING AGE, FAMILY HEALTH HISTORY, PRIOR STROKE, RACE AND GENDER, OTHER LIFE-STYLE AND ENVIRONMENTAL FACTORS CAN BE MODIFIED WITH THE HELP OF A HEALTHCARE PROFESSIONAL.

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The risk factors for stroke include:

## Increasing Age

The potential for stroke increases with age, doubling for each decade of life after age 55. While stroke is more common among the elderly, substantial numbers of people below the age of 65 experience strokes each year.

## Gender

The most recent data indicate that, overall, the incidence and prevalence of stroke are roughly equal for men and women. However, **more than half of all stroke deaths occur in women.**

## Heredity (Family History) and Race

Individuals with a family history of stroke are more at risk for experiencing a stroke themselves. **African-Americans have a much higher risk of death and disability from stroke than Caucasians,** partly due to higher rates of high blood pressure and diabetes among African-Americans. Asian-Pacific Islanders and Hispanics also have a higher risk of stroke.

## Prior Stroke

A stroke survivor has a much higher risk of developing a subsequent stroke than an individual who has not experienced an initial stroke.

## High Blood Pressure

**High blood pressure is the single most important risk factor for stroke.** Physicians define high blood pressure in an adult as a systolic pressure of 140 mm Hg or higher and/or a diastolic pressure of 90 mm Hg or higher for an extended period of time. Many healthcare professionals believe that the effective treatment of high blood pressure has been key to the accelerated decline in death rates for stroke in recent years.

## High Blood Cholesterol

A high level of total cholesterol in the blood – 240 mg/dL or higher – is a major risk factor for stroke as well as heart disease. Recent research indicates that high levels of LDL, or “bad” cholesterol – greater than 100 mg/dL – directly increase the risk of stroke for patients with prior coronary heart disease, ischemic stroke or TIA. High levels of HDL, or “good” cholesterol – 35 mg/dL or more – lower one’s risk of heart disease and stroke.

## Obesity or Overweight

Patients with too much body fat, especially around the waistline, are at higher risk for health problems including stroke. Individuals with increased risk include women with waist measurements of more than 35 inches and men with a waistline greater than 40 inches.

## Cigarette Smoking

Recent studies indicate that cigarette smoking is another important risk factor for stroke. The nicotine and carbon monoxide in cigarette smoke damages the cardiovascular system in many ways. Additionally, the combined use of birth control pills and cigarettes greatly increases stroke risk.

## Diabetes Mellitus

Diabetes is an independent risk factor for stroke and is strongly correlated with high blood pressure. While diabetes is treatable, if left untreated, it increases the risk for stroke, especially in those who are overweight and have high cholesterol.

## Carotid Artery Disease

Carotid arteries – which supply blood to the brain – may become damaged by atherosclerosis, or plaque build-up along artery walls, which can lead to blood clots and stroke. Individuals with peripheral artery disease, also caused by atherosclerosis, experience narrowing of vessels that carry blood to leg and arm muscles, which also increases the risk of stroke.

## Prior Heart Attack or Other Heart Disease

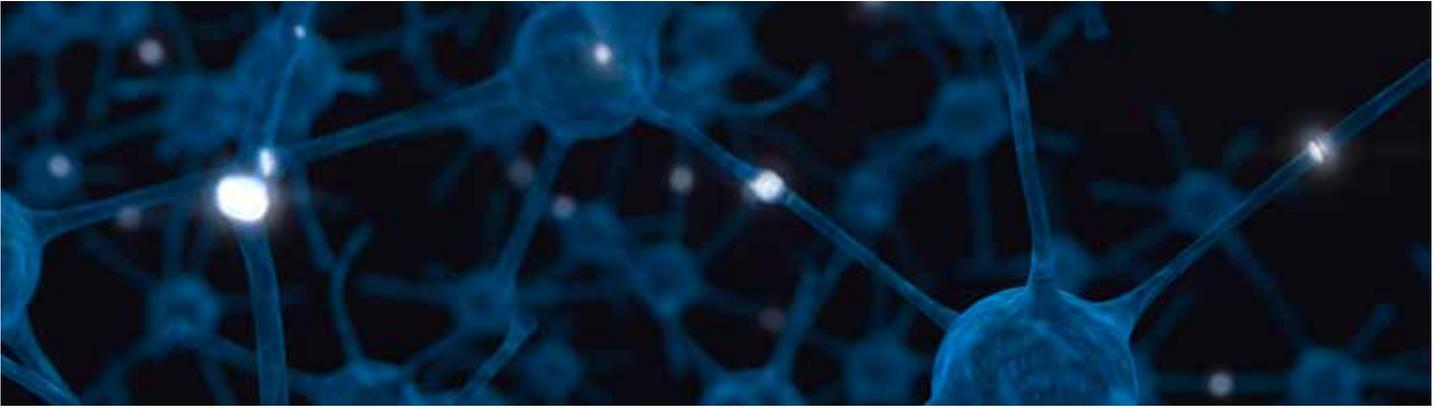
People with heart disease are more than twice as likely to experience a stroke as those with healthy hearts. Dilated cardiomyopathy (an enlarged heart), heart valve disease and some types of congenital heart defects also increase the risk of stroke.

## Atrial Fibrillation (AF)

AF – the rapid, uncoordinated quivering of the heart’s upper chambers – particularly increases the risk of stroke. **If left untreated, AF can increase one’s risk for stroke by four to six times that of a healthy person. Heart attack also is a major cause of death among stroke survivors.**

## Sickle Cell Anemia

This genetic disorder primarily affects African-American and Hispanic children. “Sickled” red blood cells are less able to carry oxygen to the body’s tissues and organs and tend to stick to blood vessel walls, thereby blocking arteries to the brain and resulting in stroke.



### Transient Ischemic Attack (TIA)

TIAs, or “mini-strokes,” can produce stroke-like symptoms, but cause no lasting damage. TIAs are strong predictors of stroke and should not be ignored. They should be treated in the same way as stroke. **A person who has experienced one or more TIAs is nearly 10 times as likely to have a stroke than someone of the same age and gender with no history of TIA or stroke.**

### Excessive Alcohol Intake / Poor Diet

Excessive drinking – defined as, on average, more than one drink per day for women and more than two drinks per day for men – and binge drinking can lead to stroke. Alcohol abuse also can raise blood pressure and contribute to obesity, high triglycerides, cancer and other diseases, including heart failure. Poor diet can also increase the risk of stroke. High-fat foods can lead to the build-up of fatty plaques in your arteries. The two types of fats that can be related to risk of stroke are saturated fats and trans fats.

### Drug Abuse

Intravenous drug abuse carries a high risk of stroke from a cerebral embolism. Cocaine use is closely related to strokes, heart attacks and a variety of other cardiovascular complications, and can be fatal – even for first-time cocaine users. Marijuana, which decreases blood pressure and may complicate other stroke risk factors, including hypertension and cigarette smoking, can damage blood vessels, leading to stroke.

### Physical Inactivity

Being inactive, obese or both can increase your risk of high blood pressure, high blood cholesterol, diabetes, heart disease and stroke. Many healthcare professionals recommend at least 30 minutes of activity per day.

# Mischer Neuroscience Institute Stroke Team

MEET OUR DIRECTORS AND ATTENDING PHYSICIANS:



**Sean Savitz, M.D.**  
Director, Stroke Center



**James C. Grotta, M.D.**  
Vascular Neurologist



**Dong Kim, M.D.**  
Director,  
Mischer Neuroscience Institute



**Nneka Ifejika-Jones, M.D.**  
Director, Neurorehabilitation



**Jerry Wolinsky, M.D.**  
Co-Director,  
Mischer Neuroscience Institute



**Mansi Jhaveri, D.O.**  
Neurorehabilitation



**Andrew Barreto, M.D.**  
Stroke Attending  
Medical Director, Neurovascular Ultrasound  
Laboratory



**Kiwon Lee, M.D.**  
Medical Director, Neuroscience ICU



**Roc Chen, M.D.**  
Endovascular/Cerebrovascular Surgery



**Amrou Sarraj, M.D.**  
Stroke Attending



**Mark J. Dannenbaum, M.D.**  
Endovascular/Cerebrovascular Surgery



**Anjali Sharrief, M.D.**  
Stroke Attending  
Medical Director, Outpatient Stroke Prevention  
Clinic



**Arthur L. Day, M.D.**  
Cerebrovascular Surgery



**Tzu-Ching Wu, M.D.**  
Stroke Attending  
Medical Director, Telemedicine



**Nichole Gonzales, M.D.**  
Stroke Attending

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MULTIDISCIPLINARY TEAMS OF TREATMENT AND REHABILITATION EXPERTS AT THE MISCHER NEUROSCIENCE INSTITUTE ARE CHARGED WITH CARING FOR PATIENTS RECOVERING FROM STROKE. WHILE NOT ALL PATIENTS WILL NEED THE SERVICES OF EACH OF THESE TEAM MEMBERS, A COMPREHENSIVE STROKE RECOVERY PROGRAM GENERALLY INVOLVES THE CARE OF NUMEROUS CLINICIANS, WHICH MAY INCLUDE THE FOLLOWING:

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**An Attending or Primary Physician** who provides supervision and care for stroke patients' medical problems and coordinates treatment plans. He or she likely will be a neurologist, who specializes in the brain or nervous system.

**A Nurse Practitioner** is an advanced practice registered nurse (A.P.R.N.) who has completed advanced didactic and clinical education. He or she will work closely with the attending or primary physician to coordinate a stroke patient's plan of care.

**A Nurse** works closely with patients, their families and the healthcare team during the initial stages following a stroke. Nurses help stroke survivors with daily care, such as taking medications, bathing, dressing and toileting, until they can do more for themselves.

**A Pharmacist** provides prescribed medications and can answer any medication-related questions.

**A Physical Therapist** helps patients who may have difficulty walking or using an arm or leg. The therapist will suggest special exercises and techniques to improve patients' muscle control and balance.

**An Occupational Therapist** helps patients perform daily tasks on their own and learn new, practical skills for everyday life.

**A Speech-Language Pathologist** helps patients improve speech, learn other ways to communicate and deal with swallowing problems.

**A Social Worker** assists patients and family members in planning ways to deal with social, emotional or financial problems that may arise during hospitalization. He or she also may assist in discharge planning.

**A Dietitian** helps plan healthy meals to encourage weight and cholesterol management, and to meet other dietary needs.

**A Stroke Coordinator** helps patients and family members understand clinical terms and manage treatment and post-treatment expectations. He or she also communicates with other team members and coordinates teaching needs.

**A Transitional Care Coordinator** helps patients transition back into the community and provides connection to community resources for follow-up care.

**A Case Manager** is responsible for reviewing admission and discharge plans. He or she will coordinate both events based on individual patient needs and will educate patients and family members in collaboration with other healthcare team members.

**A Chaplain** helps patients and family members cope with grief, feelings of loss of control, depression, desire for religious sacraments, short-term counseling needs and loneliness. He or she also discusses faith issues with patients and can help contact staff from individual churches or synagogues.

# What to Expect – Initial Evaluation

At the Mischer Neuroscience Institute, a healthcare team will measure an arriving patient's temperature, pulse and blood pressure, and generally performs urine and blood tests. A physician will perform a physical examination, which may include testing the patient's reflexes, eye movements, speech, muscle strength and tone, and coordination. Physicians also may test attention and concentration, memory and cognitive reasoning.

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## COMMON DIAGNOSTIC TESTS FOR STROKE PATIENTS

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While physical examination helps physicians determine the type of stroke suffered by a patient, other tests can provide more detailed information regarding treatment. Some common tests include:

### Computed Tomography (CAT Scan)

A CAT, or CT, scan uses a computer system to give a detailed picture of brain tissue. This test can determine whether a stroke was caused by bleeding in the brain or a blood vessel blockage. When available, a CT scan typically is one of the first tests performed on stroke patients. During the test, the patient lies on a table with his or her head in a large, donut-shaped machine that takes pictures of the brain. A CT scan generally takes approximately 15 minutes to complete and is painless.

### Magnetic Resonance Imaging (MRI)

An MRI uses a large magnetic field and radio waves to give physicians a 3-D picture of the brain. During an MRI, which is painless, a patient must lie still within the MRI scanner for approximately 30 minutes. Because the MRI provides such a sharp image of the brain, it is especially useful in identifying smaller strokes.

### Ultrasound of the Carotid Arteries (Doppler)

A Doppler ultrasound allows physicians to view the primary neck arteries and any blockages or narrowing due to atherosclerosis. During the test, a technician slowly moves a probe around the outer surface of a patient's neck. This probe gathers detailed information and sends it to a computer for analysis. This ultrasound takes approximately 45 minutes to complete and is painless.

### Lumbar Puncture

A physician performs a lumbar puncture, or spinal tap, to obtain a sample of the normally clear fluid that circulates around

the brain and spinal cord. A doctor generally does this procedure at the bedside with the patient lying on his or her side. The healthcare team will inject local anesthetics in the lower back and then insert a thin needle to gather cerebrospinal fluid. As headaches may arise following the test, patients are encouraged to drink plenty of fluids and ask their nurse for pain medication, if needed.

### Echocardiogram

During an echocardiogram, a technician slowly moves a probe over the surface of the chest to gather pictures of the heart. This procedure helps the healthcare team evaluate the size of a patient's heart, the condition of the heart valves and the motion of the heart wall. The test takes approximately one hour to complete and is painless.

### Transesophageal Echocardiogram (TEE)

A TEE provides physicians with an even more accurate view of a patient's heart. To perform the test, the healthcare team provides medication to relax the patient and numb his or her throat, then asks the patient to swallow a probe. This test can gauge the severity of certain valve problems and help detect infection of the heart valves, certain congenital heart diseases – such as a hole between the upper chambers of the heart, known as atrial septal defect – and a tear or dissection of the aorta.

### Electrocardiogram (EKG)

An EKG produces an image of the heart's electrical activity. To perform the test, a technician places wires on the surface of a patient's chest and limbs. This test takes approximately 10 to 15 minutes and is painless.

### Electroencephalogram (EEG)

An EEG is a painless test that takes approximately 45 minutes to complete and records the electrical activity of the

brain. The healthcare team will measure a patient's head and place electrodes on the scalp in preparation for the test. During the test, the patient will be asked to take several deep breaths and may be shown a strobe light that flashes at different speeds. Physicians also may want to observe brain patterns that occur during sleep. An EEG helps physicians diagnose a variety of neurological problems, including common headaches, dizziness, seizure disorders, strokes and degenerative brain disease.

### **Cerebral Angiography or Arteriography**

During this procedure, the healthcare team injects special dyes into the blood vessels of the head and neck. The dye in the blood vessels shows up on X-rays and indicates the size and location of any blockages. A physician generally will perform this test only if a patient is having surgery such as a carotid endarterectomy to remove the blockage, or if other tests have not provided sufficient information.

## **Common Complications from Stroke**

STROKE CAN CAUSE A WIDE VARIETY OF COMPLICATIONS FOR PATIENTS, DEPENDING ON THE LOCATION OF BLEEDING OR BLOCKAGE IN THE BRAIN, AS WELL AS THE AMOUNT OF TIME ELAPSED BEFORE MEDICAL TREATMENT IS ADMINISTERED. COMMON EFFECTS OF STROKE INCLUDE COGNITIVE, EMOTIONAL AND PHYSICAL IMPAIRMENTS SUCH AS THE FOLLOWING:

### **Loss of Awareness**

Because stroke survivors often lose mobility or feeling in an arm or leg or lose vision on one side, they may develop a condition called "neglect." As a result, they may ignore items on one side of the body, and even feel fully dressed after clothing only one side of the body. One-sided neglect is most common in those with injury to the right hemisphere of the brain. Their loss of awareness may lead them to bump into furniture, door jambs or other items.

### **Perception**

As a stroke can affect an individual's ability to see, touch, move and think, damage to the brain can significantly affect patients' ability to perceive everyday objects. Stroke survivors may not be able to recognize and understand familiar objects as they once did. Similarly, when vision is affected, stroke patients may misread the distance of objects, and therefore collide with objects or people.

### **Hearing and Speech**

While stroke usually does not affect the ability to hear, stroke survivors may have problems understanding speech. They also may experience difficulty articulating their thoughts, a condition called "aphasia," which can affect one's ability to talk, listen, read and write. Aphasia is most common when a stroke weakens the body's right side. Strokes also can affect muscles needed for speaking, such as those in the tongue, palate and lips. When this occurs, speech can be slow, slurred or distorted, making stroke survivors difficult to understand. This complication from stroke is called "dysarthria," and may require the assistance of a speech-language pathologist.



## Chewing and Swallowing

A stroke can affect the muscles of the mouth, tongue and throat, which can cause significant problems with chewing and swallowing food. This condition, called “dysphagia,” may be temporary or permanent, and may require the expertise of a speech-language pathologist. Stroke survivors who experience dysphagia are at risk of choking on, or aspirating, their food. Aspiration occurs when food particles, water, or even saliva, moves from the mouth into the lung, rather than traveling through the esophagus into the stomach. This complication can result from poor coordination between the larynx and the epiglottis. During normal swallowing, the epiglottis covers the airway, preventing food from going down the “windpipe” into the lungs. A stroke can cause muscle weakness, prohibiting the epiglottis from functioning properly.

A speech-language pathologist generally evaluates a stroke patient at the bedside to assess his or her swallowing mechanism. When necessary, this expert will recommend an X-ray study – called a modified barium swallow or video fluoroscopic swallow study – that monitors food as it passes from the mouth into the esophageal region, to better determine the potential for aspiration.

## Inability to Think Clearly

Planning and carrying out simple activities can become a challenge for stroke patients. Stroke survivors may experience difficulty knowing how to begin a task, confuse the sequence of logical steps in a task or forget how to complete tasks they’ve performed many times in the past. Some simple, step-by-step directions may help these individuals complete these activities. Occupational and speech therapy also may help stroke patients learn new skills.

## Depression

Stroke survivors frequently experience depression and other emotional difficulties on their journey to wellness and recovery. Depression is especially common in patients with left hemisphere strokes. Should this condition develop, a healthcare professional will diagnose and assess the severity of the depression, and will prescribe a variety of medications and psychological support, as needed.

## Emotional Abnormality

Stroke survivors can demonstrate excessive emotional swings that can include the inability to control crying or laughing spells. This internal dysfunction is a direct result of the specific location of the stroke and its impact on the emotional center deep within the brain. Physicians will evaluate these behavioral patterns and, if necessary, provide appropriate medications to treat the condition.

## Sexuality After Stroke

It is natural for a stroke survivor and his or her partner to have concerns about resuming sex after stroke. Stroke patients may feel discomfort with body changes, experience a fear of intimacy and even develop a loss of interest in sex. To best deal with these concerns, it is important for couples to openly communicate about their emotions. Professionals, including physicians, nurses, psychologists and social workers, are available to assist stroke survivors and their partners with these issues. These professionals can identify medications or lifestyle habits that may positively affect sex after stroke. It is important to remember that many stroke survivors are able to resume satisfying sexual relations, even if they have a permanent disability as a result of stroke.

## Mobility/Limb Impairment

Many stroke survivors may experience paralysis and balance problems that impair mobility. Paralysis is the inability of a muscle or group of muscles to move on their own. After a stroke, signals from the brain to the muscle can be damaged leading to paralysis of the arm, leg or both, which can cause spasticity. Spasticity is a condition where the muscles are tight, stiff and resist being stretched. It primarily affects the arms, fingers or legs. It can result in an arm being pressed against the chest, a stiff knee, a tight fist or a pointed foot that interferes with walking. It can also be accompanied by painful muscle spasms.

A physical therapist and occupational therapist will evaluate a stroke patient at the bedside to assess his or her mobility and ability to perform daily living activities to determine the best treatment plan, which may involve medications, therapies and rehabilitation.

# During the Hospital Stay...

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**U**pon admission to the hospital, a patient may be admitted to the Neuroscience Intensive Care Unit (NSICU), Stroke Unit or the Neuroscience Acute Care Unit depending on their current condition. All units are located in the Jones Pavilion at Memorial Hermann-TMC.

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## IMPORTANT NUMBERS

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**Main Hospital:** 713.704.4000

**NSICU (7th Floor):** 713.704.8740

**Stroke Unit (4th Floor):** 713.704.0407

**Neuroscience Acute Care Unit (5th Floor):** 713.704.8500 or 713.704.4008

**Case Management/Social Work Department:** 713.704.4190

**Chaplaincy Department:** 713.704.4160

**Patient Relations:** 713.704.4540

**Clinical Liaison:** 713.704.3455

# Coping and Adjustment After Stroke

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A STROKE NOT ONLY IMPACTS THE INDIVIDUAL WHO HAD THE STROKE BUT ALSO THE FAMILY AND FRIENDS WHO SURROUND THEM. BELOW IS A LIST OF HELPFUL TIPS FOR CAREGIVERS, FAMILY AND FRIENDS OF PATIENTS ON HOW TO COPE AND ADJUST TO CHANGES FOLLOWING A STROKE.

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## **Acknowledge Your Feelings About the Stroke**

A stroke may bring about emotional, physical and financial stress for the caregiver. Other emotions that may arise are denial, anger, depression, guilt or responsibility. These feelings are normal and are expected.

## **Remember to Take Care of Yourself**

It can be physically and emotionally exhausting to care for a loved one. It is important for caregivers to take moments out of the day to focus on other things and do things that are part of their routine (e.g., read a book, call a friend, exercise, take a bath, etc.).

## **Rely on Your Support Network**

Prior to leaving the hospital, caregivers should think about family and friends who may be able to assist the patient. Rely on the support system to help with the patient's care, and also to assist with everyday tasks such as grocery shopping, running errands, cooking meals, doing laundry or cleaning the house. Some stroke survivors may require some type of supervision after discharge, so it is important to work with family, friends or community resources to work out a supervision plan for the patient.

## **Educate Yourself**

It is important to speak with the medical team, nursing staff and therapists about the needs of the patient following a stroke. Take time to read articles and attend support groups if possible.

# Rehabilitation, Care and Discharge

**T**he road to recovery following a stroke will vary depending on the extent of the stroke. During the hospital stay, patients may be evaluated by physical, occupational and speech therapists to determine their rehabilitation needs. A physiatrist (physical medicine and rehabilitation physician) may also be consulted by the attending team to determine a patient's rehabilitation needs. Some patients may be able to return home with home health or outpatient therapy while others may require a long-term, acute-care hospital stay (LTACH), inpatient rehabilitation or a skilled nursing facility (SNF). A case manager or social worker will be available to review the discharge plan prior to discharge from the hospital.

## Rehabilitation

At the Mischer Neuroscience Institute, the patient's healthcare team will develop a comprehensive rehabilitation plan to address the most common initial needs of stroke survivors. The team will provide training in assisted mobility – or the ability to sit up, maintain balance, stand and walk – and will provide techniques for combating spasticity. These professionals also assist patients with activities of daily living and provide skills training to help facilitate self-dressing, self-grooming, light meal preparation and independence.

Throughout rehabilitation, physical therapists will employ a range-of-motion program for stroke patients so that stiffness and spasticity are less problematic. A speech therapist will address any abnormal speaking or swallowing issues and provide compensatory strategies to avoid aspiration. Similarly, physicians will assess patients' cognitive function during rehabilitation and provide treatment and education on medication management, as needed.

Upon discharge, stroke survivors may be recommended to the Neurorehabilitation Program at the Mischer Neuroscience Institute, which offers comprehensive inpatient services, state-of-the-art technology and innovative therapies and techniques. In the program, patients will receive an individualized treatment plan to reach identified goals.

Stroke survivors also have access to care at TIRR Memorial Hermann, recognized for 23 years as one of America's "Best Rehabilitation Hospitals" by *U.S. News & World Report*. The Stroke Rehabilitation Center at TIRR Memorial Hermann is specially designed to maximize an outcome for patients who have suffered a stroke.

Recovery from stroke does not end with a patient's discharge from the inpatient program. Rather, recovery continues long after the return home. Memorial Hermann offers outpatient rehabilitation locations throughout the greater Houston area for patients who require additional treatment and need access to specialized rehabilitation staff.

## Memorial Hermann Rehabilitation Network

### Inpatient

Memorial Hermann-Texas Medical Center

TIRR Memorial Hermann

Memorial Hermann Northwest Hospital

Memorial Hermann Rehabilitation Hospital-Katy

Memorial Hermann Southeast Hospital

Memorial Hermann Southwest Hospital

### Outpatient

TIRR Memorial Hermann

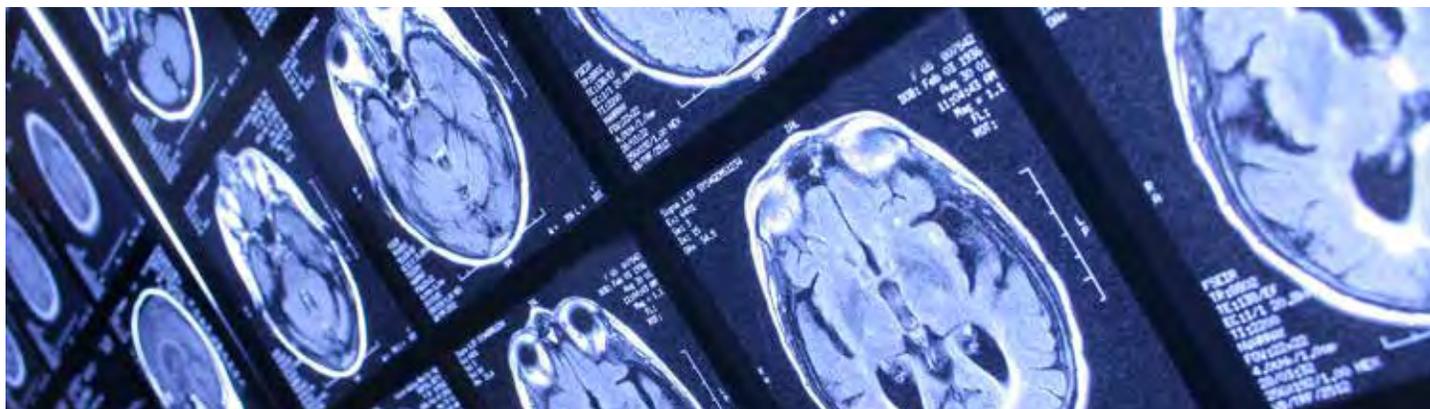
TIRR Memorial Hermann Outpatient Rehabilitation-Kirby Glen Center

TIRR Memorial Hermann Outpatient Rehabilitation-Memorial City

TIRR Memorial Hermann Outpatient Rehabilitation-Northwest

Memorial Hermann Rehabilitation Hospital-Katy

For more information or to schedule an appointment, please call 1.800.44.REHAB (7.3422) or 713.797.5988



Many stroke survivors may continue to experience neurological or physical symptoms following hospitalization. These impairments may include:

### **Post-Stroke Seizures**

Seizures may occur at the time of stroke, as well as up to two weeks following stroke. These seizures are caused by an electrical discharge that can result after brain cell injury due to lack of blood – known as ischemic stroke – or from free bleeding within the brain – known as hemorrhagic stroke. Seizures that occur in the weeks following stroke often are treated with anti-seizure medication.

### **Spasticity After Stroke**

Within a few days or weeks following stroke, some people develop “spasticity” in parts of the body affected by the stroke. Spasticity is the constant and unwanted contraction of one or more muscle groups as a result of damage to the brain or spinal cord, and can cause severe pain. This involuntary contraction of certain muscle groups prevents voluntary movement of affected body parts.

Spasticity generally presents as a bending of the joints of the hand, wrist and fingers, as well as in the hip, knee and ankle. This condition can occur at rest and may worsen when patients attempt to move. If the brain injury resolves and voluntary movement returns, spasticity may diminish, restoring the usefulness of the limb. However, with stroke patients, the damage often is permanent and the spasticity must be treated independently with medication.

### **Shoulder-Hand Syndrome (Also known as Reflex Sympathetic Dystrophy)**

Shoulder-hand syndrome is common in stroke survivors and occurs as a result of abnormal nerve input from hands or shoulders. Stroke patients with this condition may experience pain in the hands or shoulders, as well as a discoloration of the skin on the hand in later stages. As this condition can be problematic to treat, patients should be monitored closely by their physicians.

### **Stroke Medications**

Stroke survivors should follow their physician’s medication orders closely. These medications can work only if used as prescribed.

# Discharge Worksheet

IMPORTANT INFORMATION TO KNOW PRIOR TO DISCHARGE:

I will follow up with the neurosurgeon at:

UT Physicians Neurology Clinic

6410 Fannin St.

Suite 1014

Houston, TX 77030

832.325.7080

[www.neuro.memorialhermann.org](http://www.neuro.memorialhermann.org)

Appointment Date/Time: \_\_\_\_\_

Prior to my follow-up appointment I will need (imaging, labs, etc.):

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I will be discharged on the following medications:

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Special instructions (home health, outpatient therapy, additional follow-up appointments, etc.):

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**To ensure continuity of care, please notify your primary care physician (PCP) of your recent hospitalization.**



# Stroke Research: Participating in a Study or Clinical Trial

## How do I decide if I want to participate in a research study or clinical trial?

Research is not treatment. While there is no guarantee that you will be helped by participating in a study, you will help researchers better understand the problem and possibly help other people in the future.

## Who can be in a study?

Each research study has clearly defined requirements for participation, which will vary depending on the topic of investigation. A member of the research team will discuss the study with you, answer your questions and tell you if you qualify as a study participant. All study participation is completely voluntary.

## What questions should I ask?

You are welcome to ask the research team any questions about their study. Also, be sure to ask them the following questions:

- What do you want to learn from the study?
- What exactly will happen to me during the study?
- Will I experience any unpleasant side effects?
- Will the research help me personally?
- What other options do I have?
- Can I leave the study at any time?
- What will happen with the information I provide to you?
- Will my insurance have to pay for anything?
- Will I have to pay for anything?

The research team will provide you with an informed consent form with details about the study. Please read this form carefully and discuss it with your family and physician before making your decision regarding participation. If you agree to participate, you will be asked to sign this form.

## Who pays for research studies and clinical trials?

Many different entities sponsor clinical research, including the federal government, industries and private foundations. Among the many federal agencies that sponsor research, the National Institutes of Health (NIH) is one of the best known. Drug and medical device companies also fund research and must show that their products are safe and effective by performing clinical trials.

While the sponsor covers certain parts of the research study, your insurance company may pay for routine care that would be necessary regardless of your study participation. You will be responsible for paying for any part of the study not funded by either the sponsor or your insurance company.

## What happens to the information I provide to researchers?

All information about you and your participation in a research study is private and confidential. If you would like to learn the results of the study, please ask the research team to send you its findings following completion of the trial. In some instances, the sponsor or a governmental agency, such as the Food and Drug Administration, may have the right to confidentially review your information.

## What are my rights if I participate? How am I protected?

An important part of research is protecting the people who choose to participate. Researchers and healthcare professionals must follow federal laws, ethical codes and national standards when working with human subjects. Your rights and welfare are protected by several organizations, including:

- Institutional Review Boards (IRBs)
- Food and Drug Administration (FDA)
- Department of Health and Human Services (DHHS)
- Office for Human Research Protections (OHRP – a division of DHHS)
- Joint Commission on the Accreditation of Hospitals (JCAHO)
- Association for the Accreditation of Human Research Protection Programs (AAHRPP)

# Resources

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NEED MORE INFORMATION?

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## American Stroke Association (ASA):

[www.strokeassociation.org/STROKEORG/](http://www.strokeassociation.org/STROKEORG/)

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## Department of Assistive and Rehabilitation Services (DAR)

[www.dars.state.tx.us](http://www.dars.state.tx.us)

Telephone: 1.800.628.5115

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## Houston Aphasia Recovery Center (HARC)

[www.harctx.org](http://www.harctx.org)

Telephone: 832.767.5028

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## Mischer Neuroscience Institute at Memorial Hermann-Texas Medical Center

[www.neuro.memorialhermann.org](http://www.neuro.memorialhermann.org)

## UT Physicians Neurology Clinic:

Telephone: 832.325.7080

## Mischer Neuroscience Associates:

Telephone: 713.704.7100

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## National Stroke Association (NSA):

[www.stroke.org](http://www.stroke.org)

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## Social Security Administration

[www.ssa.gov](http://www.ssa.gov)

Telephone: 1.800.772.1213

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## Stroke Family Warmline

Although all members of the ASA's national call team are qualified to answer questions about stroke, the Warmline team members have a personal history with the condition – either they or a family member have experienced stroke.

Telephone: 1.888.4.STROKE (787653)

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## Stroke Support Group at Mischer Neuroscience Institute

*Third Wednesday of Every Month at 2:30 p.m.*

[www.neuro.memorialhermann.org/support](http://www.neuro.memorialhermann.org/support)

Telephone: 713.222.CARE (2273)

Email: [supportgroup@memorialhermann.org](mailto:supportgroup@memorialhermann.org)

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## Texas Department of Aging and Disability Services

[www.dads.state.tx.us](http://www.dads.state.tx.us)

Telephone: 1.888.834.7406

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Mischer  
Neuroscience Institute

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HERMANN

6411 Fannin  
Houston, TX 77030

[neuro.memorialhermann.org](http://neuro.memorialhermann.org)  
713.222.CARE