A RESOURCE FOR PATIENTS

Cleveland Clinic’s Cerebrovascular Center, nationally recognized for its stroke care, has a Joint Commission-certified Comprehensive Stroke Center at Cleveland Clinic main campus, providing life-saving care for stroke patients in your community. Our network of nine Primary Stroke Centers and six Stroke Ready Centers use consistent protocols to ensure the best outcomes for patients. This means these facilities have met stringent national stroke care standards. Our Primary Stroke Centers are at Euclid, Fairview, Hillcrest, Lakewood, Marymount, Medina and South Pointe hospitals, Cleveland Clinic Florida and at the Ashtabula County Medical Center. Interventional stroke capabilities are available at main campus, Hillcrest and Lakewood hospitals and Cleveland Clinic Florida.

USING THIS GUIDE

Please use this guide as a resource as you begin to learn about your treatment options. Remember, it is your right as a patient to ask questions and to seek a second opinion.

If your primary care physician is not on staff at Cleveland Clinic, he or she can keep in constant contact with our team via a dedicated consultation line and through our DrConnect secure online network.

No matter which Cleveland Clinic facility you choose, you are assured of standardized stroke care across our health system. Patients receive comprehensive treatment by an interdisciplinary team of stroke specialists including neurologists, neurosurgeons and interventional neuroradiologists, as well as rehabilitation, emergency medicine and nursing specialists with expertise in stroke care.

In addition, patients at Cleveland Clinic’s Cerebrovascular Center have access to investigational therapies and new surgical procedures that are not widely available. Our staff provides the highest-quality stroke care available anywhere.
WHAT IS A STROKE?

Each year, nearly 800,000 Americans have a new or recurrent stroke, which is the nation’s fourth leading cause of death and a leading cause of serious long-term disability, according to the American Heart Association and American Stroke Association.

A stroke, or “brain attack,” occurs when the blood supply is cut off from part of the brain. When this happens, the blood-deprived brain loses its supply of oxygen and nutrients. When the brain is deprived of blood for even a few minutes, it begins to die.

There are two types of stroke — ischemic and hemorrhagic.

In ischemic strokes, brain arteries become blocked and prevent blood from nourishing the brain. In hemorrhagic strokes, brain arteries rupture from damage caused by high blood pressure and other risk factors or an aneurysm (an abnormal out-pouching of a blood vessel). This causes blood to flood the brain, creating pressure that leads to brain-cell death.

Strokes do occur in young patients, and pediatric stroke requires highly specialized care. We maintain a dedicated pediatric stroke program for the evaluation and management of childhood stroke from birth to age 18. We are also part of the International Pediatric Stroke Study group, actively participating in pediatric stroke clinical trials and data collection. Our pediatric neurology team works closely with pediatricians and pediatric specialists at Cleveland Clinic Children’s, offering advanced medical care and rehabilitation services.

Remember that for every minute brain cells are deprived of oxygen during a stroke, brain damage increases. The chances for survival and recovery improve when treatment begins within the first few hours of stroke warning signs.

Immediate treatment of a stroke may limit or prevent brain damage. A thrombolytic agent or “clot buster” medication may be given within the first three hours of the onset of stroke symptoms. Hence, it is critical to get to the hospital quickly if you experience stroke symptoms. The fastest way is to call 9-1-1.
WHAT ARE RISK FACTORS FOR A STROKE?

If your primary care physician has diagnosed you as being at risk for a stroke, a Cleveland Clinic stroke neurologist can help determine your best course of treatment.

Many factors increase the risk for stroke. Some factors can be controlled; others cannot.

- **Family history:** Those who have a family history of strokes or a prior stroke are at higher risk for having a stroke.
- **High blood pressure:** Strokes are four to six times more likely to occur in people with high blood pressure.
- **High cholesterol:** People with high cholesterol are at double the risk of having a stroke.
- **Heart disease:** Strokes are six times more likely to occur in people with heart disease.
- **Excess weight:** Being overweight can lead to heart disease and high cholesterol, which, in turn, increase chances of having a stroke.
- **Alcohol use:** Heavy drinking increases the risk for stroke.
- **Tobacco use:** Smokers have double the risk for stroke as nonsmokers.
- **Gender:** Approximately 55,000 more women than men have a stroke each year.
- **Race:** African-Americans have a higher rate of stroke than other races.
- **Age:** After age 65, there is an increased likelihood of stroke.
- **Chronic disease:** Diabetics are at higher risk for stroke.

How can I reduce my risk?

- Control your blood pressure.
- Find out if you have heart disease, especially an irregular heartbeat known as atrial fibrillation (AF).
- Don’t smoke.
- Find out if you have a diseased carotid artery (arteries that provide blood flow to the head).
- Lower your cholesterol.
- Limit your alcohol intake.
- Control your weight.
- If you have diabetes, manage the disease.
WHAT ARE THE WARNING SIGNS?

Many warning signs indicate you may be suffering a stroke. Depending on the function of the part of the brain affected, the person suffering the stroke suddenly may become paralyzed, blind or unable to speak.

It is crucial to get to a hospital immediately. If you experience any of these major stroke warning signs, call 9-1-1:

- sudden loss of speech
- slurred speech
- sudden loss of vision
- blurry or double vision
- sudden paralysis
- sudden weakness
- sudden dizziness
- sudden, severe headache, often accompanied by neck stiffness and vomiting

For patients with risk factors, medications for blood pressure, diabetes and high cholesterol are important preventive measures. Smoking must stop. A person who has had transient ischemic attacks (also known as TIAs or ministrokes) or a stroke may be treated with aspirin or other antiplatelet or anticoagulant medications to reduce the risk of another attack. A type of surgery called carotid endarterectomy is sometimes recommended to reduce the risk of a major stroke. In this procedure, the fatty deposits in the carotid artery that block blood flow to the brain are removed. Non-surgical options for opening blocked carotid arteries include angioplasty and stenting.

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Stroke Awareness: BE FAST

In a stroke, every minute counts. Use the BE FAST method to evaluate whether someone may be having a stroke:

**B** BALANCE: Watch for a sudden loss of balance.

**E** EYES: Is there a sudden loss of vision in one or both eyes? Or double vision?

**F** FACE: Ask the person to smile. Does one side of the face droop?

**A** ARMS: Ask the person to raise both arms. Does one arm drift downward?

**S** SPEECH: Ask the person to repeat a simple phrase. Is their speech slurred or strange?

**T** TIME: If you observe any of these signs, call 9-1-1 immediately.
WHAT TREATMENT OPTIONS ARE AVAILABLE?

Our highly trained, diverse team of board-certified specialists and sub-specialists collaborates to provide comprehensive care for stroke patients. That team includes:

- vascular neurologists
- cerebrovascular and endovascular neurosurgeons
- interventional neuroradiologists with training in neurosurgery, radiology and neurology
- neurointensivists (physicians specially trained in neurocritical care)
- pediatric stroke neurologists
- neuroanesthesiologists
- stroke rehabilitation specialists

As indicated by our national awards and certifications, Cleveland Clinic’s Cerebrovascular Center has a rigorous stroke care protocol that meets or exceeds national standards and guidelines that improve outcomes. Diagnostic tools such as brain image scans help guide treatment, and neurologists conduct fast but thorough patient evaluations. Further, Cleveland Clinic has been recognized for its fast “door-to-needle” time – the time from arrival at the hospital to administration of intravenous therapies. This timing is recognized as crucial in stroke treatment.

Cleveland Clinic’s Neurological Intensive Care Unit (ICU) is staffed 24/7 by a team of critical care neurologists.

For pediatric stroke patients, we offer a dedicated pediatric ICU staffed full time by experienced pediatric intensivists and pediatric neurologists.

At our Neurovascular Ultrasound Laboratory, we perform advanced diagnostic examinations to detect abnormalities in the circulation of blood through the brain. This aids in assessing why a patient has suffered a stroke or transient ischemic attack (TIA) and helps determine the best therapies.

CRITICAL CARE TRANSPORT

If you or someone in your family is having a stroke, expedited transport is crucial. Cleveland Clinic’s critical care transport team is available 24 hours a day to transport patients to our facility from anywhere in the world. Our fleet consists of mobile ICU vehicles, helicopters and fixed-wing aircraft.

Specialty care teams of physicians, nurse practitioners, critical care nurses, paramedics and allied health professionals provide customized care, including pediatric care for infants, children, teens and young adults. In transit, these teams can communicate with your primary care physician or any doctor who has been treating you.
WHAT CAN I EXPECT FROM REHABILITATION?

In collaboration with the Neurological Institute’s Department of Physical Medicine and Rehabilitation, we offer a full spectrum of rehabilitation services designed to return stroke patients to the best possible quality of life.

Our continuum of care spans all phases of the rehabilitative process, from hospital to home. Our multidisciplinary team of rehabilitation specialists includes physiatrists, neurologists, rehabilitation nurses, physical and occupational therapists, speech and language pathologists, psychologists, social workers, recreational therapists and case managers.

These professionals help patients with cognition, mobility, communication, self-care and more. Rehabilitation begins at the inpatient stage and continues on an outpatient basis, including support from Cleveland Clinic Home Care Services, if needed. Comprehensive rehabilitation services for pediatric patients are offered through our Cleveland Clinic Children’s Hospital for Rehabilitation.

WHAT RESEARCH IS BEING DONE TO IMPROVE STROKE CARE?

Lerner Research Institute, the basic science research arm of Cleveland Clinic, houses 36 scientists working on neurologically based research projects. Ongoing cerebrovascular research includes several stroke-related studies such as:

- subcortical stimulation for rehabilitation of motor deficits following stroke
- delivery of antioxidant enzymes in cerebral stroke
- cognitive training that may enhance motor function in stroke patients
- functional and anatomical adaptations of the brain after stroke and as a result of medical rehabilitation

Access to Clinical Trials

The Cerebrovascular Center has led several major international trials of stroke medications, including the first-ever trial of intra-arterial thrombolysis in acute stroke. Our patients have the opportunity to participate in other leading-edge clinical research trials, such as:

- an investigation of insulin resistance intervention after stroke
- a study of stenting and aggressive medical management for preventing recurrent stroke
- an evaluation of mechanical retrieval and recanalization of stroke clots using a surgical technique called embolectomy
- a trial of stenting devices for symptomatic ischemic stroke

Patients also may qualify to participate in studies investigating possible genetic links to the development of brain aneurysms.

To learn more about our clinical trials, call Amy Richmond at 216.444.9524.
WHY CHOOSE CLEVELAND CLINIC?

Cleveland Clinic is a nonprofit multispecialty academic medical center, consistently ranked among the top hospitals in America by U.S. News & World Report. Founded in 1921, it is dedicated to providing quality specialized care and includes an outpatient clinic, a hospital with more than 1,300 staffed beds, an education institute and a research institute.

One of 26 institutes at Cleveland Clinic, the multidisciplinary Neurological Institute is committed to improving outcomes while treating patients with compassion and respect. By bringing together physicians from different training backgrounds and experiences, the Institute’s Cerebrovascular Center offers a collaborative, multidisciplinary environment to meet the needs of patients suffering from cerebrovascular disorders. This unique disease-centered approach allows individualized care for each patient, bringing together a variety of expert perspectives, including:

- Board-certified vascular and interventional neurologists
- Board-certified cerebrovascular and endovascular neurosurgeons
- Board-certified interventional neuroradiologists
- Board-certified neurointensivists
- Stroke prevention and rehabilitation specialists
- Pediatric stroke neurologists

Cerebrovascular Center patients are seen at our main campus in Cleveland and at locations throughout Northeast Ohio and in Weston, Florida.

In addition to strokes, the Cerebrovascular Center provides treatment for brain aneurysms, brain and spinal vascular malformations, carotid stenosis, intracranial atherosclerosis and other cerebrovascular conditions. If you or someone you know has a cerebrovascular disorder, please do not hesitate to contact us.

NEED A SECOND OPINION BUT CANNOT TRAVEL TO CLEVELAND?

Our MyConsult service offers secure online second opinions for patients who cannot travel to Cleveland. Through this service, patients enter detailed health information and mail pertinent test results to us. Then, Cleveland Clinic experts render an opinion that includes treatment options or alternative recommendations regarding future therapeutic considerations.

To learn more about MyConsult, please visit clevelandclinic.org/myconsult.

AMERICA’S BEST HOSPITALS

U.S. News & World Report’s “America’s Best Hospitals” survey has consistently ranked both our Pediatric and Adult Neurology and Neurosurgery programs among the top 10 in the nation and best in Ohio.
QUESTIONS TO ASK WHEN CONSIDERING A PROVIDER FOR STROKE CARE

Q: Is the neurologist/neurosurgeon fellowship trained?
A. Our stroke neurologists and cerebrovascular and endovascular neurosurgeons are fellowship trained. Their areas of expertise combine research, education and clinical practice to provide innovative and scientifically based treatments for cerebrovascular disease with the highest quality patient care.

Q: Do you work within a multidisciplinary team?
A. The Cerebrovascular Center at Cleveland Clinic understands the importance of tailoring therapy for each patient. By bringing together physicians from different training backgrounds and experiences, we offer a collaborative, multidisciplinary environment to meet the needs of patients suffering from cerebrovascular disorders. This unique disease-centered approach allows us to approach each patient with a consensus plan, benefiting from a variety of expert perspectives including:

- Board-certified vascular neurologists
- Board-certified cerebrovascular and endovascular neurosurgeons
- Interventional neuroradiologists with training in neurosurgery, radiology and neurology
- Neurointensivists
- Neuro-anesthesiologists
- Stroke prevention and rehabilitation specialists

Q: How many cerebrovascular cases does the surgeon treat each year?
A. Our Cerebrovascular Center team completed more than 1,000 surgical/interventional procedures last year with 1,499 admissions and 4,219 outpatient visits.

Q: Will I be cared for in a dedicated NICU (Neurological Intensive Care Unit) with neurointensivists present in the unit 24/7?
A. Within our 22-bed, state-of-the-art dedicated Neurointensive Care Unit (NICU), we treat more than 1,300 patients per year, with 24/7 coverage. This full service NICU is equipped to treat any patient with neurological injury, regardless of the severity. The NICU also is equipped to handle any heart, lung and gastrointestinal problems that may arise in neurological patients. In addition, we have specialized equipment specifically for the treatment of patients with neurological illnesses, including inside-the-brain oxygen sensors and blood flow monitors, and portable head Computed Tomography (CT) scanning.

Q: What is the average length of stay?
A. The length of your stay in the hospital is one indication of how good the entire care team, from physicians to nurses and others, are in expediting your recovery and return to home. At the Cleveland Clinic Cerebrovascular Center, we have achieved and maintained average lengths of stay for our patients consistently below national benchmarks for four years in a row. The expected length of stay in the hospital will vary based on your particular condition and treatment, but at the Cerebrovascular Center many treatments can now be done without a single night spent in the hospital.

Q: What are your mortality rates?
A. Cleveland Clinic Cerebrovascular Center mortality rates have remained well below the national averages for several years. This results from our patients having access to the highest levels of specialty care and the resources available to respond to patient needs 24 hours per day. Make sure the physician you select has extensive experience treating your condition and has a multidisciplinary team. Experience counts and good outcomes similar to the Cerebrovascular Center depend on a team approach.
OUR STAFF

Peter Rasmussen, MD, FAHA, FAANS  
**Director, Cerebrovascular Center**  
Specialty Interests: cerebrovascular and endovascular neurosurgery

Mark Bain, MD  

Dhimant Dani, MD  
Specialty Interests: ICU management of stroke, subarachnoid hemorrhage, traumatic brain injury, neurological emergency requiring ICU care

Neil Friedman, MBChB  
Specialty Interests: pediatric neuromuscular disease, pediatric stroke and cerebrovascular disease, neurocardiology, fetal and neonatal neurology

Jennifer A. Frontera, MD  
Specialty Interests: Neurointensive care; cerebrovascular diseases, subarachnoid, intracerebral or subdural hemorrhage, acute or malignant stroke, vascular malformations, aneurysms, status epilepticus, delirium, encephalopathy, coagulopathy, traumatic brain injury, spinal cord injury, autoregulation, hepatic encephalopathy

Joao Gomes, MD  
Specialty Interests: acute stroke treatment, stroke imaging, therapeutic hypothermia for neuroprotection, intracranial hemorrhages, vascular malformations and aneurysm, neurocritical care

Ferdinand Hui, MD  
Specialty Interests: Interventional and therapeutic neuroradiology, MR flow imaging, cerebrovascular disease, intracranial atherosclerosis, kyphoplasty

M. Shazam Hussain, MD, FRCPC  
Specialty Interests: cerebrovascular diseases, acute stroke therapy, neuroimaging, carotid dissection, vertebral artery stenosis/blockage, endovascular therapy (coiling, stenting)

Irene Katzan, MD, MS  
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Zeshaun Khawaja, MD  
Specialty Interests: cerebrovascular disease, secondary stroke prevention, stroke outcomes, risk factor management

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continued
OUR STAFF continued

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Laurie McWilliams, MD
Specialty Interests: intracranial hemorrhage, cerebral hemorrhage and hemorrhagic stroke, status epilepticus

Dolores Wisco, MD
Specialty Interests: acute stroke management, carotid artery disease management, intracranial stenosis management, infective endocarditis with cerebrovascular complication, stroke process and outcomes

J. Javier Provencio, MD, FCCM
Specialty Research Interests: neurological intensive care, neuroinflammation in clinical illness

CONTACT US
Please call 216.636.5860 or toll free at 866.588.2264 to schedule an appointment. Or call the Cerebrovascular Center Consultation Line at 216.445.1587 or Toll Free: 800.CCF.CARE, extension 51587.

For more information, visit clevelandclinic.org/stroke
Same-day appointments available. To make an appointment with a specialist in the Cerebrovascular Center, please call 216.636.5860 or toll-free 866.588.2264. has a Joint Commission-certified Comprehensive Stroke Center at Cleveland Clinic main campus providing life-saving care for stroke patients in your community. Our network of nine Primary Stroke Centers and six Stroke Ready Centers use consistent protocols to ensure the best outcomes for patients. Cleveland Clinic has Primary Stroke Centers at Euclid, Fairview, Hillcrest, Lakewood, Marymount, Medina and South Pointe hospitals, at Cleveland Clinic Florida and at the Ashtabula County Medical Center. Interventional stroke capabilities are available at Cleveland Clinic main campus, Hillcrest and Lakewood hospitals and Cleveland Clinic Florida.
ABOUT CLEVELAND CLINIC

Cleveland Clinic is an integrated healthcare system with a main campus, 18 family health centers, eight community hospitals and locations in Ohio, Florida, Nevada, Toronto, and Abu Dhabi. It is a not-for-profit group practice where nearly 3,000 staff physicians and scientists in 120 medical specialties, collaborate to give every patient the best outcome and experience. Cleveland Clinic is ranked among America’s top hospitals overall, and among the nation’s leaders in every major medical specialty (U.S. News & World Report).

Its multidisciplinary Neurological Institute, one of 26 institutes at Cleveland Clinic, is internationally known for superior diagnosis and treatment of neurological disorders ranging from the common to the most complex. More than 300 specialists combine clinical expertise, academic achievement and innovative research to accelerate transfer of investigational therapies unavailable elsewhere, for the benefit of adult and pediatric patients. The institute is committed to improving outcomes while treating patients with compassion and respect.

The Cerebrovascular Center integrates a multidisciplinary team of neurologists, neurosurgeons, neuroradiologists, neurointensivists and rehabilitation specialists who provide expert diagnosis and medical, endovascular and surgical management of all cerebrovascular conditions.

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Cleveland Clinic

Every life deserves world class care.

9500 Euclid Ave., Cleveland, OH 44195

The Neurological Institute is a leader in the diagnosis and treatment of common and complex neurological disorders of adult and pediatric patients. Its more than 300 specialists combine expertise and compassion to achieve measurably superior results. By promoting innovative research and integrated care models, the Neurological Institute accelerates the adoption of new treatments and technologies into patient care. The Neurological Institute is one of 27 institutes at Cleveland Clinic, a nonprofit academic medical center ranked among the nation’s top hospitals (U.S. News & World Report), where more than 3,000 physicians and researchers in 120 specialties collaborate to give every patient the best outcome and experience. clevelandclinic.org

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