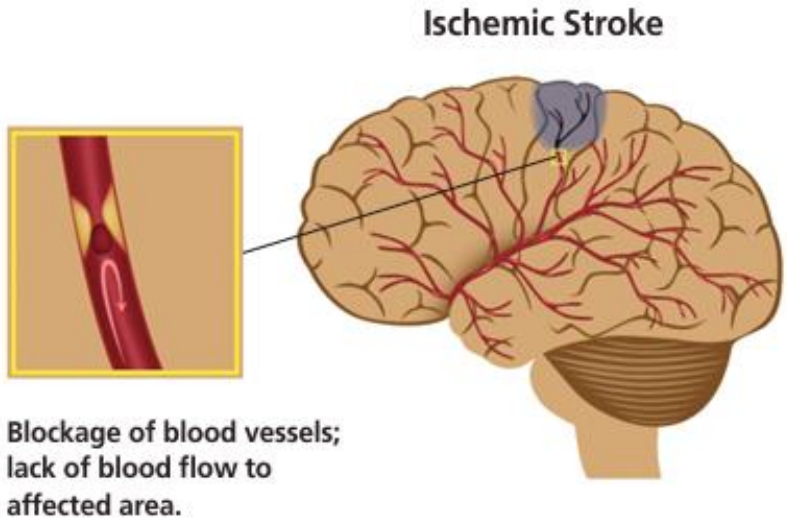
STROKE / TIA BOOKLET

What Happens During a Stroke?

The brain constantly needs blood flow. During a stroke, blood circulation to part of the brain stops, or blood leaks into the wrong place. Brain cells in the affected area are damaged, and this part of the brain may no longer be able to function. No one can tell exactly how much function will return, but the greatest amount of recovery occurs within the first three to six months after a stroke.

What is an ischemic stroke?

An **ischemic** stroke occurs when blood flow to part of your brain is blocked. The blockage is usually caused by a blood clot that gets stuck in a narrow blood vessel. When oxygen cannot get to an area of the brain, tissue in that area may get damaged. The damage can cause loss of body functions controlled by that area of the brain.



What is a transient ischemic attack?

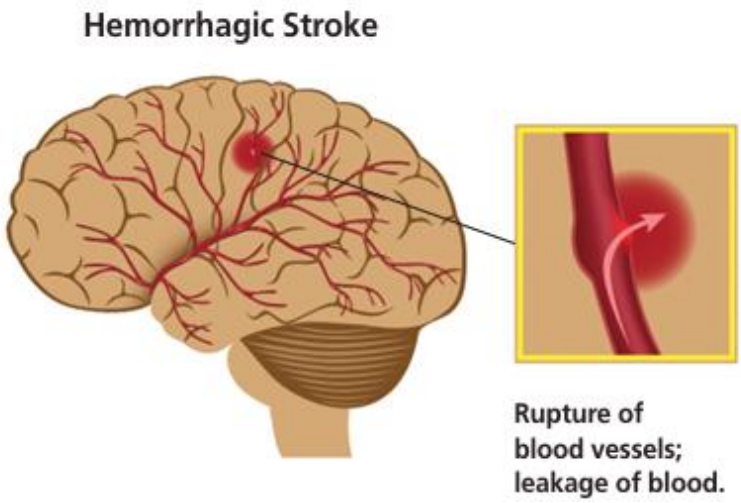
A **transient ischemic attack (TIA)**, or mini stroke, happens when blood cannot flow to part of the brain. A TIA lasts minutes to hours and does not cause lasting damage. It is still important to get ***immediate medical care*** for a TIA. A TIA may be a warning sign that you are about to have a stroke.

What is a hemorrhagic stroke?

A **hemorrhagic** stroke happens when a blood vessel tears or bursts. Blood that leaks out of the vessel can create pressure that keeps oxygen from flowing to the brain, leading to brain injury.

Intracerebral hemorrhage (ICH) is a type of hemorrhagic stroke that happens when blood collects within the brain tissue. ICH is often associated with high blood pressure, blood thinner medication, blood clotting disorders, and blood vessel abnormalities.

Subarachnoid hemorrhage (SAH) is a type of hemorrhagic stroke that happens when blood collects in the subarachnoid space. This space is under the protective tissues that cover the brain. SAH is most often associated with an abnormal blood vessel that has burst. This abnormal blood vessel often has an area of weakening called an aneurysm.

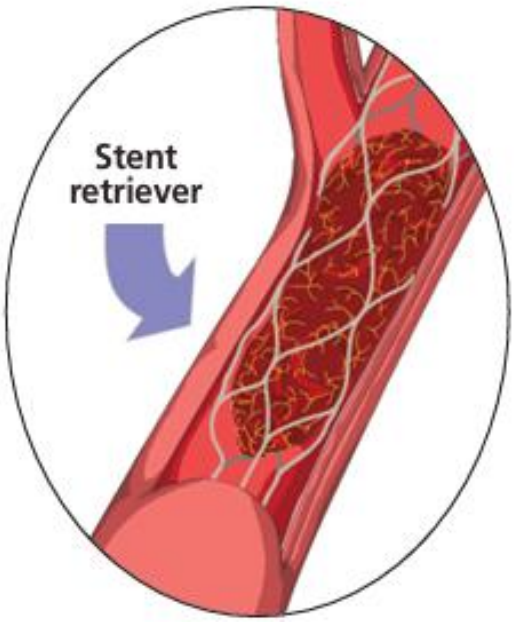


Stroke Treatment

Ischemic Stroke Emergency Treatment
Only certain patients are eligible for these emergency treatments. **The most important thing you can do to be eligible for these treatments is to call 9-1-1 at the first sign of a stroke.**

TPA (tissue plasminogen activator) is an IV medication that helps break down blood clots and improve blood flow to the brain. If given within up to 4.5 hours in certain eligible patients, tPA improves the chances of recovering from a stroke.

Thrombectomy is a minimally invasive procedure that removes blood clots. During the procedure, a catheter is threaded through an artery in the groin up to the brain. A wire-caged device called a stent retriever is inserted into the catheter. The stent reaches past the clot, expands to stretch the walls of the artery, and is pulled backward to remove the clot and restore blood flow. Thrombectomy has been shown to reduce disability after stroke.



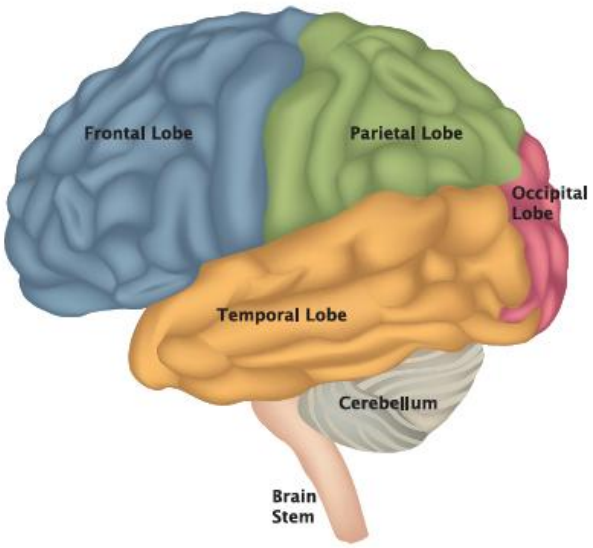
Surgical & Procedural Treatment

Neurosurgical treatment may be used to treat hemorrhagic strokes and some large ischemic strokes. A craniotomy – the removal of part of the skull bone – may be done to control bleeding and decrease pressure in the brain, or to treat an abnormal blood vessel.

Coiling is a procedural treatment for SAH caused by an aneurysm. Coiling closes off blood flow into the aneurysm by packing it with coils. This is done in Comprehensive stroke centers.

How Stroke Affects You

Your symptoms depend on the part of the brain that was injured during the stroke.



LEFT Brain

The left side of the brain controls the right side of the body. A stroke on the left side of the brain can cause:

- Right-sided paralysis, weakness and/or numbness
- Personality changes
- General disorganization
- Vision problems
- Memory loss and difficulty concentrating
- Speech and language difficulties

RIGHT Brain

The right side of the brain controls the left side of the body. A stroke on the right side of the brain can cause:

- Left-sided paralysis, weakness and/or numbness
- Lack of awareness of the left side of the environment and/or the left side of the body
- Impulsive behavior
- Lack of or poor judgment
- Vision problems
- Memory loss
- Emotional changes

Occipital Lobe

An occipital lobe stroke happens in the back of the brain. A stroke in the occipital lobe often results in visual changes, such as:

- Partial vision loss
- Blindness
- Visual hallucinations

Cerebellum

The cerebellum controls voluntary and involuntary movements as well as balance and eye movement. A stroke in the cerebellum can cause:

- Coordination and balance problems
- Dizziness, nausea, and vomiting

Brain Stem

The brain stem controls bodily functions such as breathing, swallowing, heart rate, blood pressure, and consciousness. A stroke in the brain stem can cause:

- Paralysis in one or both sides of the body
- Difficulty swallowing

Deep Brain Structures

Structures that lie deep within the brain, including the thalamus, basal ganglia, and internal capsule, can also be affected by stroke. Strokes in these areas can cause:

- Weakness on one side
- Numbness, tingling, or burning on one side

Your Hospital Team

Attending provider – This may be your Intensivist or a Hospitalist, who specializes in caring for hospitalized patients. Your attending provider will admit you to the hospital, coordinate your care with specialist providers, including a neurologist, and discharge you from the hospital.

Specialist Providers – May include a neurologist, neuroradiologist, neuro-interventionalist, neurosurgeon, cardiologist, physiatrist, and other specialists as needed.

Nurses and Patient Care Associates (PCAs) –
Nurses provide 24-hour bedside care that includes monitoring your condition for changes, giving medications, and addressing physical and emotional needs. PCAs perform tasks to assist the nurses to meet basic patient needs.

Rehabilitation Therapists – Physical, occupational, and speech therapists will help you improve the function that was affected by your stroke. They will assess difficulty with strength, daily activities, speech, and swallowing and design a rehabilitation program individualized to meet your needs.

Care Coordination – The nurse case manager and social worker collaborates to identify the best discharge plan for you. Based on your resources and recommendations from members of the healthcare team, they will work with you to make sure you receive rehabilitation or nursing services as necessary after your discharge.

Testing

Computerized tomography (CT) is performed to detect a hemorrhagic stroke. It can also show ischemic stroke, but only six to 12 hours after onset.

Cerebral angiogram is the most definitive way to view blood vessels in the brain. For this test, a small catheter is placed through an artery in the wrist or groin and moved through the main blood vessels in the chest and neck. Dye is injected, and x-ray images are taken to create a 3D view of your vessels.

Carotid ultrasound is a blood flow test that provides information about the carotid and vertebral arteries in the neck that supply blood to the brain.

Magnetic resonance imaging (MRI) is a test that produces very accurate pictures of the brain and its arteries without x-rays or dye. This test is useful for detecting a wide variety of brain and blood vessel abnormalities and can usually determine the area of the brain damaged by ischemic stroke.

- During an MRI, you will lie on a table, which will be moved into an open space in the middle of the machine. It is normal to hear knocking, thumping, or clicking noises. An MRI of the brain will take approximately 45 minutes.

Echocardiogram (Echo) is a test that uses sound waves to create a picture of the heart. It can provide pictures of the heart's valves and chambers and help evaluate the pumping action of the heart.

- **Transesophageal echocardiography (TEE)** uses sound waves from a transducer that is placed in the esophagus to produce a very detailed picture of the heart, especially the back of the heart.

Cardiac monitoring (telemetry) is used to monitor the electrical activity of your heart. The recordings taken during monitoring show healthcare providers if there are problems with how your heart beats. Telemetry monitoring is usually kept in place throughout your hospital stay.

Learn About Your Risk Factors

Some risk factors, like being over age 55 or having a family history of stroke, are things you can't change. Other risk factors, like some health conditions and your lifestyle, can be managed.

Sedentary Lifestyle and Obesity

Having a sedentary lifestyle, being overweight or obese, or both can increase your risk for stroke. A sedentary lifestyle means that you are active for less than 150 minutes per week.

High Cholesterol

High cholesterol is one of the major controllable risk factors for stroke. Cholesterol is not inherently "bad," but too much cholesterol contributes to a higher risk of heart disease and stroke.

High Blood Pressure

High blood pressure (HBP) is a major risk factor for stroke. Uncontrolled HBP can lead to stroke, heart attack, heart failure, or kidney failure. It causes damage to the inner lining of the blood vessels. This can narrow arteries and lead to ischemic stroke. This damage also strains blood vessels, which can lead to rupture and hemorrhagic stroke.

Diabetes

Diabetes, also called diabetes mellitus, is a condition that causes blood sugar to rise. This elevated blood sugar increases a person's risk for stroke. Over time, excessive blood glucose can result in increased fatty deposits or clots in blood vessels. These clots can narrow or block the vessels, cutting off blood supply, and causing a stroke.

Atrial Fibrillation

Atrial fibrillation (AFib) is a heart rhythm disorder. In AFib, a clot can form in the heart and travel to the brain, causing a stroke. If you have AFib, your doctor will discuss with you the need for blood thinner medication to prevent stroke and TIA.

Heart Disease or Heart Attack

People who have heart disease or heart failure are at higher risk of stroke than people who have healthy hearts. An enlarged heart (cardiomyopathy), heart valve disease, and some types of congenital heart defects can also raise the risk of stroke. With these heart conditions, it is important to follow up with your doctors for management.

Hemorrhagic Stroke Risk Factors

- High blood pressure
- Blood thinner medication
- Abnormal blood vessel
- Heavy alcohol intake
- Illegal drug use
- Smoking

- Sedentary lifestyle or obesity
- High cholesterol
- High blood pressure
- Diabetes
- Atrial fibrillation
- Heart disease or heart attack
- Smoking
- Arterial disease (carotid stenosis, peripheral vascular disease)
- Blood clotting disorder, Obstructive sleep apnea

Smoking

Smoking is a major cause of stroke and heart attack. Cigarettes, e-cigarettes, and tobacco products contain many dangerous toxins, such as nicotine and carbon monoxide. These chemicals can damage blood vessel lining, leading to thickening and narrowing. They can also make blood sticky and more likely to clot which can block blood flow to the heart and brain.

Arterial Disease

Arterial disease is a problem in which narrowed arteries lead to reduced blood flow. In carotid artery disease, vessels in the neck that carry blood to the brain are affected. In peripheral vascular disease, arteries that carry blood to the arms and legs are affected. The narrowing results from atherosclerotic buildup, also known as plaque deposits of fatty materials like cholesterol and calcium. Over time, plaque narrows the arteries and decreases blood flow.

Blood Clotting Disorder

People with blood clotting disorders (hypercoagulopathy) have an increased risk of blood clots developing in the blood vessels. These clots can block blood flow, leading to heart attack or stroke. Clotting disorders can be caused by certain gene mutations and are also associated with oral contraceptive use, hormone replacement therapy, pregnancy, and cancer.

Obstructive Sleep Apnea

Sleep apnea is a condition in which breathing is interrupted repeatedly during sleep. It is usually characterized by daytime sleepiness (or fogginess), loud snoring, and episodes of breathing pauses or gasps. Sleep apnea is common in stroke patients, and, if untreated, can negatively affect recovery. Diagnosis and treatment of sleep apnea after stroke is especially important, as having sleep apnea increases the risk for future stroke. Risk factors for obstructive sleep apnea include obesity, large neck size, hypertension, airway abnormalities, and family history.

Blood Thinner Medication

Blood thinner medication can increase the risk of bleeding in the brain and lead to a hemorrhagic stroke. But these same medications may be necessary to prevent an ischemic stroke, especially if you have atrial fibrillation or a blood clotting disorder. If a blood thinner is prescribed for you, take your medication regularly and carefully review the information about anticoagulants in the medications section of this booklet.

Abnormal Blood Vessel

Aneurysms and arteriovenous malformations (AVMs) are two types of abnormal blood vessels that can rupture causing a hemorrhagic stroke. An aneurysm is a ballooning of a weakened region of a blood vessel. An AVM is a cluster of abnormally formed blood vessels.

Heavy Alcohol Intake

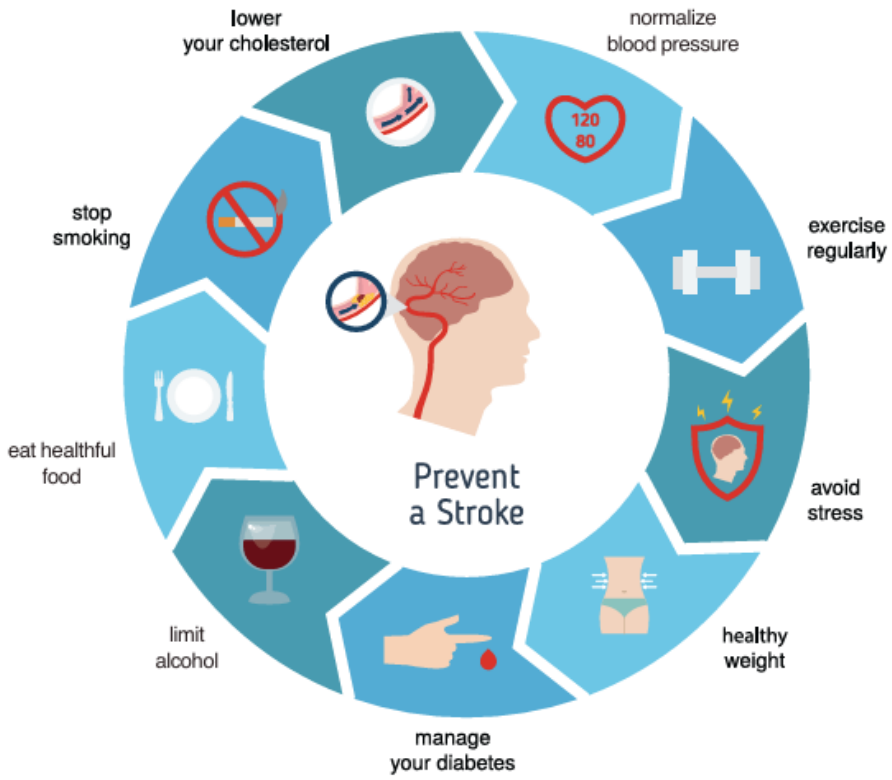
Chronic alcoholics have decreased concentrations of clotting factors. Chronic alcoholism may also cause high blood pressure. Impaired clotting and high blood pressure increase the risk of hemorrhagic stroke in alcoholics.

Illegal Drug Use

Most illegal drugs can have adverse cardiovascular effects, ranging from abnormal heart rate to heart attack or stroke. The most commonly abused drugs, including cocaine, amphetamines, and heroin, have been associated with an increased risk of hemorrhagic stroke.

Healthy Behaviors

Adding healthy behaviors to your lifestyle is an important part of your plan to prevent another stroke. Read on to learn what you can do to reduce your stroke risk.



Eat Healthful Food

Eating healthy foods can help you to lose weight, lower cholesterol, and keep blood pressure controlled. Choosing the right foods means eating more vegetables and fruits while limiting fat and salt. Drink water or low-fat milk with meals and avoid sugary sodas and salty vegetable juices. At least half of your plate should be vegetables and fruits, and you should limit fatty toppings, such as butter, salad dressing, and sour cream. No more than one-quarter of the plate should be meat or other protein. Fish, beans, tofu, and lean cuts of poultry are best. Bake or broil instead of frying. About one-quarter of the plate can be grains, such as rice, bread, pasta, and tortillas. Whole grains, such as brown rice or whole-wheat bread, are best.

Exercise Regularly

Being active can help prevent stroke and heart attack, lower high blood pressure, and recover lost skills. It's best to be active for at least 30 minutes each day. This activity can become a part of your regular routine. Activities that you might try include yardwork (raking), housework (vacuuming), playing with children or grandchildren, using the stairs instead of the elevator, and parking further away from your destination. Walking is great exercise and is easy to get started with. With whatever activity you choose, build up to at least 150 minutes of exercise each week.

Healthy Weight

Excess body weight and obesity are linked with an increased risk of high blood pressure, diabetes, heart disease, and stroke. If you are overweight, losing as

little as five to 10 pounds can make a significant difference in your risk. Even if weight control has been a lifelong challenge, start by taking small steps today to manage your weight.

Normalize Blood Pressure

If you have high blood pressure or take blood pressure medication, check your blood pressure regularly, write it down, and bring your numbers to your doctor visits. This helps your doctor to know whether your medications are working. Even if your blood pressure readings are normal, don't stop taking your medication without speaking with your doctor.

Manage Your Diabetes

If you are diabetic, check your blood sugar regularly, write it down, and bring your numbers to your doctor visits. This helps your doctor to know whether your medications are working. Even if your readings are normal, don't stop taking your medication without speaking with your doctor. Talk with your doctor about your A1C test results. This test shows your average blood glucose levels for the past three months.

Limit Alcohol

Drinking alcohol can raise blood pressure and increase the risk of stroke. Alcohol can also react with certain medications. Ask your doctor if it's safe for you to drink alcohol.

Stop Smoking

If you smoke, now is the time to quit! Smoking raises blood pressure and damages arteries, which can lead to stroke. We have a smoking cessation program in Lincoln.

Avoid Stress

Acknowledge that the mind, body, and spirit act as one and try to incorporate practicing resilience when faced with adversity or daily annoyances. Resiliency allows one to recover from setbacks and reduce stress. Stress can make your heart work harder and raise blood pressure. Make sure to get proper rest. Finally, don't be embarrassed to ask for help when you need it.

Take Your Medication

Taking your medication regularly as prescribed can greatly reduce your chances of another stroke. To keep on track, create a routine to take your medication at the same time each day. Take all your medications because some medications work best when used with others. Plan ahead and refill your prescriptions before they run out. Never change your dosage or stop taking your medication without first talking to your doctor. Tell your doctor if you experience any medication side effects.

Follow Up with Your Healthcare Provider

After a stroke, it is important to follow up with your medical team. You can help improve the care you receive at follow-up appointments by talking with your healthcare team about your concerns, asking questions, and getting the facts. Take part in decisions about your treatment, follow the treatment plan you and your doctor agree on, watch for problems, and become actively involved in solving them to reduce your risk of stroke.

Medications

Antiplatelets

Antiplatelets keep blood clots from forming by keeping blood platelets from sticking together. These medications can help prevent ischemic stroke and heart attack. Aspirin is the most commonly prescribed antiplatelet. Some patients are prescribed two antiplatelet medications to be taken together for up to three months. Examples of this second antiplatelet medication include clopidogrel (Plavix®) or ticagrelor (Brilinta®).

Anticoagulants

Anticoagulants, known as blood thinners, are medicines that delay the clotting of blood. They are used to prevent ischemic stroke in patients with certain health conditions, such as atrial fibrillation. Examples are apixaban (Eliquis®), rivoraxaban (Xarelto®), dabigatran (Pradaxa®), and warfarin (Coumadin®).

It's important to follow these tips while on anticoagulants:

- If you take warfarin, have regular blood tests so your healthcare provider can tell how the medicine is working.
- Discuss your diet with your healthcare providers. Food rich in Vitamin K can reduce the effectiveness of warfarin.
- Never take aspirin with anticoagulants unless your doctor tells you to.
- Always talk to your healthcare provider before taking any new medicines or supplements.
- Make sure all your healthcare providers and your family know that you're taking an anticoagulant.
- Always carry your emergency medical ID card.

Know the side effects of anticoagulants and tell your doctor right away if:

- -Your urine turns pink, red, or brown. This could be a sign of urinary tract bleeding.
- Your stools turn red, dark brown, or black. This could be a sign of intestinal bleeding.
- Your gums bleed.

- You have a very bad headache or stomach pain that doesn't go away.
- You get sick or feel weak, faint, or dizzy.
- You often find bruises or blood blisters.
- You have an accident, such as a bump on the head, a cut that won't stop bleeding, or a fall of any kind.

Statins

People with high cholesterol are often prescribed medications to help lower their cholesterol. The most common cholesterol-lowering drugs are called statins. Statins disrupt the production of cholesterol in the liver, causing less cholesterol to be released into the bloodstream. Statins also reduce the inflammatory process caused by elevated cholesterol within blood vessel walls. Examples of statins include atorvastatin (Lipitor®) and rosuvastatin (Crestor®)

Rehabilitation

Rehabilitation after hospital discharge may include:

- Training to improve mobility and ability to do daily tasks
- Access to cognitive/engagement activities
- Speech therapy
- Eye exercises
- Balance training
- Adaptive strategies to help you function within a "new normal"

Rehabilitation Settings

Based on your needs, you may receive rehabilitation therapy in your home, at an outpatient rehabilitation center, in an acute or subacute inpatient rehabilitation setting, or in a long-term care/skilled nursing facility.

Homecare – Homecare includes registered nurses, physical and occupational therapists, speech-language pathologists, and nursing assistants who provide care under the direction of your primary care provider. An individualized homecare program is developed by the registered nurse. Homecare is provided to patients who live at home but are unable to travel for treatments.

Outpatient Therapy – The outpatient therapy team is made up of physical and occupational therapists, speech language pathologists, and a physiatrist. Our therapists collaborate to provide each patient with a goal-oriented plan of care to maximize function. Outpatient therapy is for patients who can live at home and travel to get their appointments. Patients may attend therapy sessions two to three times a week.

Acute Inpatient Rehabilitation – In an acute rehabilitation setting, patients receive 24-hour medical care and comprehensive therapy for up to three hours per

day. To be admitted to acute rehabilitation, patients must meet specific criteria and be able to participate in intensive therapy. The length of stay will depend on your goals and progress.

Subacute Inpatient Rehabilitation – These settings provide daily nursing care and therapy to medically stable patients who are unable to return home and are unable to participate in intensive therapy. Therapy may be provided for one to two hours per day up to five days per week.

Long-term Care/Skilled Nursing Facility – These settings provide care for patients who have daily skilled nursing care needs.

Follow-Up Care

Primary Care Provider

You will need to see your primary care provider to help manage your care, monitor your recovery, and prevent another stroke.

Neurology

You will also have a follow-up appointment with a neurologist to create a plan to prevent another stroke.

Cardiology

You may also need to visit a cardiologist if you have specific cardiac risk factors for stroke.

Driving after stroke

Driving is a complex skill that requires coordination, which may be affected by changes after a stroke. Your doctor will help you decide when you may be ready to drive.

WHEN IT COMES TO STROKE

BE FAST CALL 911