

# **STROKE**

EDUCATION, RECOVERY AND PREVENTION



**Beaumont**

If you think that you or a loved one is having a stroke, remember to act **FASTER**.

# ***FASTER***

## ***FACE***

- drooping or numbness on one side of face
- when asked to smile, person's smile is uneven

## ***ARMS***

- one arm drifts down when raising both arms or one arm is weaker and more numb

## ***STABILITY***

- dizziness
- difficulty keeping balance or trouble walking
- loss of coordination

## ***TALKING***

- slurring of words
- unable to speak
- hard time being understood or understanding speech
- can't repeat a simple sentence like "The sky is blue."

## ***EYES***

- difficulty seeing out of one or both eyes
- double vision

## ***REACT***

- **Call 911 immediately!**
- Call if a person is experiencing any of these symptoms—even if they go away.
- Get to a hospital at once.
- Try to remember when the symptoms first began.





## YOUR GUIDE TO STROKE EDUCATION, RECOVERY AND PREVENTION

We know that being in the hospital is stressful, and it can be even more overwhelming when it involves your brain. We're here to do everything we can to make you and your family as comfortable as possible.

This book is designed to provide you and your family with information regarding stroke, transient ischemic attacks (TIA), the risk factors that contribute to them and what you can do to help recovery. Beaumont is committed to treating stroke patients across the life span including, but not limited to, neonates, pediatrics, young adults and geriatrics.

We hope that you and your family will use this booklet as a guide for answering some of the questions or concerns that you may have, but we know that it can't answer everything.

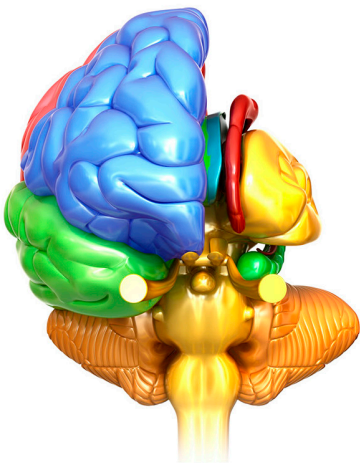
**If you have any other questions, please ask your health care team.**



**Beaumont**

# REGIONS OF THE BRAIN

## WHERE DID YOUR STROKE OCCUR?



## MY DIAGNOSIS

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## MY RISK FACTORS

- |   |  |
|---|--|
| <input type="checkbox"/> high blood pressure    | <input type="checkbox"/> obesity                 |
| <input type="checkbox"/> diabetes               | <input type="checkbox"/> obstructive sleep apnea |
| <input type="checkbox"/> high cholesterol       | <input type="checkbox"/> substance use           |
| <input type="checkbox"/> atrial fibrillation    | <input type="checkbox"/> depression              |
| <input type="checkbox"/> carotid artery disease | <input type="checkbox"/> certain blood disorders |
| <input type="checkbox"/> tobacco use            | <input type="checkbox"/> high caffeine intake    |
| <input type="checkbox"/> poor diet              | <input type="checkbox"/> heavy alcohol intake    |
| <input type="checkbox"/> physical inactivity    |  |

## MY GOALS

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

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**FOR ADDITIONAL  
RESOURCES, CHECK  
THE POCKET AT THE  
BACK OF THIS BOOK.**

# YOUR HEALTH CARE TEAM

Your health care team will be working closely with you after your stroke to plan your care. Remember that you and your family are an important part of your health care team. Members of your health care team are here to partner with you and will include:

## MEDICAL TEAM

Your doctor(s), nurse practitioners (NP) and physician assistants (PA) will direct the care you receive during your hospital stay. This team may include individuals from neurology, internal medicine, neurosurgery or critical care.

## NURSING STAFF

Registered nurses and nursing assistants will work closely with you, your family, your medical team and other team members to inform your health care team of any change in your condition, as well as progress made.

## PHYSICAL MEDICINE, REHABILITATION & SPEECH AND LANGUAGE PATHOLOGY

- **physical therapist (PT)** - focuses on maximizing movement and stability, such as walking, balance and coordination
- **occupational therapist (OT)** - focuses on helping rebuild skills in daily living activities such as bathing, toileting and dressing
- **speech and language pathologist (SLP)** helps to improve language skills, swallowing and thought processing
- **physiatrist** - a doctor who specializes in rehabilitation
- **psychiatrist or psychologist** - helps patients adjust to the emotional challenges and potential new circumstances of their lives

## NUTRITION

A registered dietitian may meet with you to develop a plan to help you with your nutrition.

## CARE MANAGEMENT

Care management will meet with you and assess your discharge needs and help with needed resources. They will talk with you and your family about insurance coverage, home health care, rehabilitation and equipment that may be needed.

## SOCIAL WORK

A social worker may meet with you to assess your emotional and social needs. Please let your health care team know if you have any emotional or spiritual needs during your stay.

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**Your health care team is committed** to listening to your questions and concerns carefully, and taking the time to explain things to you and your family in a way that you understand.

**We are here to be your partner in care,** so please let us know if there is anything we can assist with.

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# FACTS ABOUT STROKE

## WHAT IS A STROKE?

A stroke occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked or bursts (ruptures). When that happens, part of the brain cannot get the blood and the oxygen it needs and brain cells die.

## POSSIBLE EFFECTS OF STROKE

### Motor and sensory function

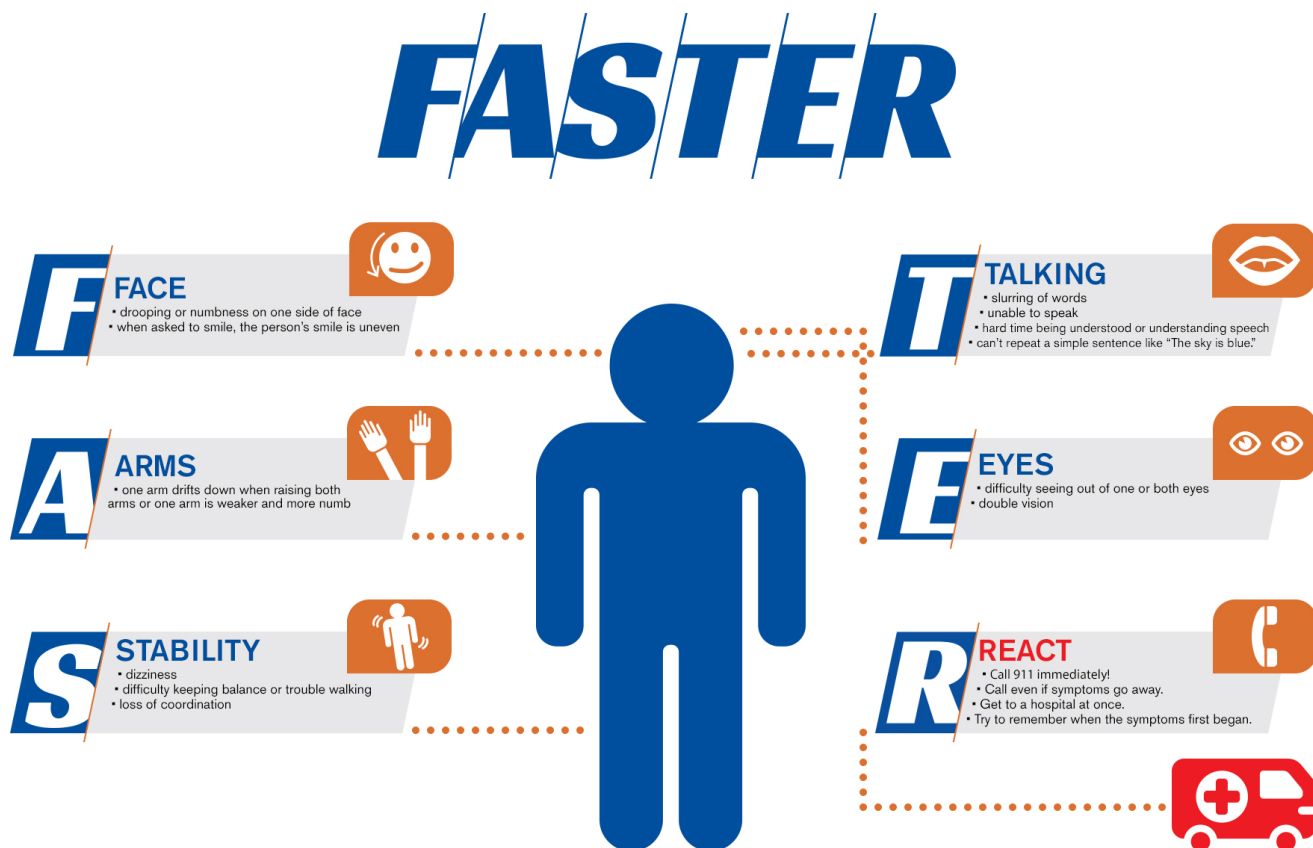
The human brain is divided into several areas that control how the body moves and feels. When a stroke damages a certain part of the brain, that area may no longer work as well as it did before the stroke, which can cause problems with walking, speaking, seeing or feeling.

### Functions of certain sides of the brain

The left side of the brain controls how the right side of the body moves and feels. It's responsible for how well we can solve problems with science, understand what we read and what we hear, our number skills such as adding and subtracting, and reasoning. The right side of the brain controls the movements and sensation on the left side of the body. The right side of the brain also determines how artistic we are, including musical and creative talents.

## DIAGNOSING A STROKE

Signs and symptoms of a stroke



## WARNING SIGNS OF A STROKE

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

**Call 911 immediately if you or a family member experience these warning signs. Do not drive yourself to the hospital.**

Other conditions may have symptoms similar to a stroke and may need to be evaluated in order to diagnose a stroke.

**In the emergency center, a doctor or stroke emergency team will:**

- ask you when the symptoms of the stroke started
- ask you about your medical history
- conduct a physical and neurological examination
- order certain laboratory (blood) tests
- perform imaging tests
- request additional tests that may be needed

## POSSIBLE IMAGE TESTS

### CT scan (computed tomography)

A CT Scan is an imaging test of the brain that uses radiation to create a picture (like an X-ray) of the brain. It is usually one of the first tests given to a patient with stroke symptoms to help determine the type of stroke that is occurring.

### MRI (magnetic resonance imaging)

An MRI uses a large magnetic field to produce an image of the brain. Like the CT scan, it shows the location and extent of the brain injury. The image produced by MRI is sharp and detailed, so it is often used to diagnose small, deep injuries.

### Transthoracic Echocardiogram

This ultrasound imaging procedure is used to assess the heart's function and structures. It can be used to check for conditions such as congenital birth defects, heart failure and endocarditis (an infection inside the heart), which might identify the cause of the stroke.

### TEE (transesophageal echocardiogram)

A TEE looks at the same structures as a regular echocardiogram, but is performed using an ultrasound probe down the throat to look directly at the heart.

### CTP (computed tomography perfusion)

This is an enhanced CT scan that uses dye to look at brain arteries and determine potential treatment.

### Carotid artery doppler

A carotid artery doppler is a test that takes images of the blood flowing through the large arteries in the neck to detect if there is narrowing.

### CTA (cerebral angiography/cerebral arteriography)

A CTA can be performed to diagnose and show the degree of narrowing, hardening or blood clot in the vessels of the head and neck.

# ISCHEMIC STROKE

An ischemic (is-KEEM-ik) stroke occurs when a blood clot blocks an artery, cutting off or narrowing the flow of oxygen-rich blood to the brain cells. Unless nearby blood vessels can deliver enough blood to the affected area, brain cells will begin to die. As brain cells die, stroke sufferers may start to have problems using certain parts of their bodies or completely lose some abilities.

## Facts about ischemic stroke:

- Ischemic strokes are the most common type of stroke and account for about 85 percent of all stroke cases.
- Symptoms develop over a few minutes to an hour and can worsen over hours.
- Ischemic strokes are usually preceded by symptoms or warning signs that may include loss of strength or sensation on one side of the body, problems with speech and language or changes in vision or balance.

## TYPES OF ISCHEMIC STROKE

**Embolic ischemic stroke** – A blood clot or plaque fragment forms somewhere in the body (usually the heart or neck arteries) and moves through the bloodstream to the brain. Once in the brain, the clot blocks a blood vessel and leads to a stroke.

**Thrombotic ischemic stroke** – A blood clot blocks an artery which supplies blood to the brain. The clot may interrupt the blood flow and cause a stroke. These strokes are common in arteries damaged by atherosclerosis (fatty deposits in the artery).

**Cryptogenic stroke** – In most cases, a stroke is caused by a blood clot that blocks the flow of blood to the brain. In some instances, despite testing, the cause of a stroke cannot be determined. In this case, the stroke of unknown cause is called a cryptogenic stroke.

Testing that may be used to determine the cause of a stroke includes:

- blood tests
- imaging
- loop recorder – your health care team may recommend placement of an implantable event monitor to evaluate for abnormal heart rhythms

## TREATING ISCHEMIC STROKE

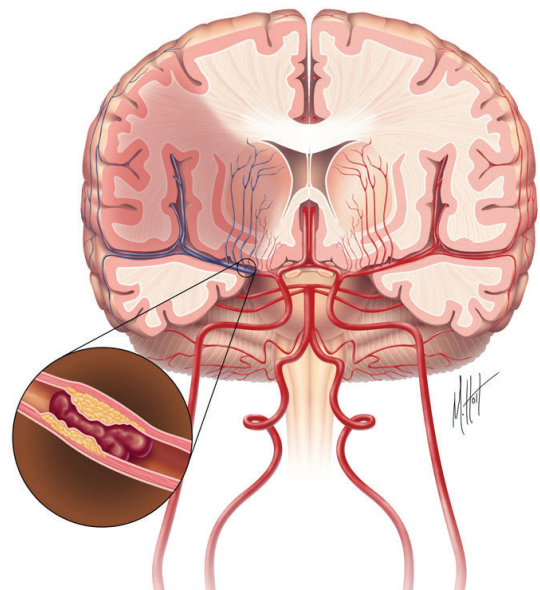
Typical treatment for ischemic stroke may include intravenous tissue plasminogen activator/alteplase/tPA, mechanical thrombectomy, medication therapy and close monitoring of a patient's post-stroke status and vitals.

### Tissue plasminogen activator (tPA)

A clot-busting drug available for treatment.

To receive tPA, a physician must diagnose your stroke as an ischemic stroke and treat you within 3 to 4.5 hours of the onset of symptoms. Please note that not everyone is a candidate for tPA and specific procedures must be followed.

**Mechanical thrombectomy** - Based on the timing of your symptoms, a procedure to remove a clot, known as mechanical thrombectomy, may be an option. Mechanical thrombectomy devices are designed to remove blood clots from large vessels within the brain. A catheter is inserted into the groin and into the blocked brain artery to remove the clot.





## TRANSIENT ISCHEMIC ATTACK (TIA)

If an artery leading to the brain, or inside the brain, becomes blocked by a blood clot for a short period of time, the blood flow to an area of the brain slows or stops completely. This lack of blood and oxygen can cause a transient ischemic (TRAN-see-ynt is-KEEM-ik) attack, or TIA. TIA can cause stroke-like symptoms. It is common for these symptoms to last for a very short period and then disappear. While TIAs cause no permanent brain damage, they are a serious warning sign of increased risk for future stroke and should not be ignored.

People may mistakenly refer to a TIA as a “mini stroke,” however a TIA does not result in permanent damage to brain tissue and cannot be seen on imaging.

### RISK FACTORS FOR ISCHEMIC STROKE AND TIA

Your doctor(s), nurse practitioners (NP) and physician assistants (PA) will direct the care you receive during your hospital stay. This team may include individuals from neurology, internal medicine, neurosurgery or critical care.

#### Risk factors you can change (modifiable):

- high blood pressure
- diabetes
- high cholesterol
- atrial fibrillation
- carotid artery disease
- tobacco use
- poor diet
- physical inactivity
- obesity
- substance use
- depression
- obstructive sleep apnea (OSA)

#### Risk factors that cannot be changed (non-modifiable):

- prior stroke or TIA
- family history of stroke or TIA
- race and ethnicity
- genetics
- certain blood disorders
- age
- gender



# HEMORRHAGIC STROKE

Hemorrhage is the medical term for bleeding. A hemorrhagic stroke occurs when blood vessels in the brain leak or rupture, causing bleeding in or around the brain. Damage can occur quickly due to the pressure of increasing amounts of blood or because of the blood itself.

The two types of hemorrhagic strokes:

## Intracerebral hemorrhage (ICH)

Bleeding into the brain is called intracerebral hemorrhage (ICH) and is most often caused by high blood pressure.

## Subarachnoid hemorrhage (SAH)

Bleeding around the brain is referred to as subarachnoid hemorrhage (SAH) and is often caused by an aneurysm (bulge or rupture of an abnormal blood vessel) on the surface of the brain.

In the hospital, patients experiencing a hemorrhagic stroke may be treated with:

- medications and other treatments to reduce the brain damage caused by the bleeding
- medications to lower your blood pressure, if your blood pressure is too high
- stopping any medications you take that thin the blood or prevent it from clotting. If you take blood-thinning medicines, you may be given treatments to help your blood clot so that you stop bleeding
- do tests to figure out the cause of the bleeding
- monitor the pressure in your brain to make sure that it doesn't get too high
- some people are also treated with surgery, depending on their symptoms and other factors

Physicians can perform surgery to:

- remove a collection of blood, if it is pressing down on the brain or causing the brain to swell
- stop the bleeding in the brain and fix the blood vessel that was bleeding

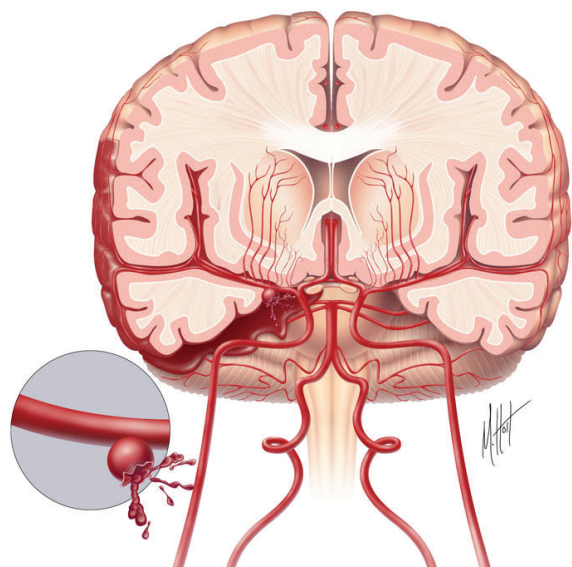
## RISK FACTORS FOR INTRACEREBRAL HEMORRHAGE (ICH)

Risk factors for ICH that you can change (modifiable):

- high blood pressure
- heavy alcohol intake
- diabetes
- high cholesterol
- tobacco use
- poor diet
- physical inactivity
- obesity
- substance use
- high caffeine intake

Risk factors for ICH that cannot be changed (non-modifiable):

- prior history of intracerebral hemorrhage or family history of intracerebral hemorrhage
- race and ethnicity
- genetics
- age
- gender



# SUBARACHNOID HEMORRHAGE (SAH)

A subarachnoid hemorrhage (SAH) occurs when a blood vessel either on or inside the brain suddenly begins to leak blood. This blood settles into a space between the surface of the brain and the skull called the subarachnoid space.

## WHAT CAUSES SAH?

Most SAH cases are caused by a ruptured brain aneurysm. An aneurysm is a weak area in the wall of brain artery that bulges out like a balloon. The bulge may stretch and cause the vessel's wall to get thinner and thinner until it breaks. This is called a rupture.

## RISK FACTORS FOR SAH

Risk factors for SAH include:

- high blood pressure
- tobacco use
- alcohol use
- substance abuse
- family history
- age over 40
- women have an increased incidence of aneurysms compared to men.
- arteriovenous malformation (AVM)
- having other diseases, such as polycystic kidneys, connective tissue disorders, neurofibromatosis and other diseases

## TREATING SAH

The first goal of treatment is to prevent another bleed. If an aneurysm or AVM has ruptured or leaked once, it is almost certain to do so again.

There are two main ways to prevent another bleed:

1. Reduce the artery strain by reducing blood pressure. Lowering blood pressure cuts down the force of the blood moving within the artery. When the artery wall has weakened to a breaking point, the priority of treatment is to reduce blood pressure and the things that elevate it. Your blood pressure will be closely monitored and you may be given medication to keep it at a safe level. It is important to reduce stimulation in your environment while you are recovering.
2. Aneurysm repair: secure the bleeding site by repairing the leaking artery. The shape and location of the ruptured aneurysm determines the type of repair.

Your health care team may use one these methods:

- **Aneurysm coiling:** The neurosurgeon or interventional radiologist inserts a very thin, highly flexible tube called a catheter into an artery, usually in the groin, and threads it through the arteries until it reaches the aneurysm. At the tip of this catheter is a tiny coil that is then placed into the bulge of the aneurysm. The physician keeps repeating this process until the aneurysm is filled with the coils. These coils reduce the blood flow and cause a clot to form that seals the aneurysm.
- **Aneurysm clipping:** This is done with a craniotomy, or brain surgery. During the operation, the neurosurgeon applies a small metal clip to the base of the aneurysm. The clip cuts off the blood flow into the weakened area, and this causes the aneurysm to form a clot and shrink.

## REDUCING POSSIBLE SIDE EFFECTS

The brain can react to the SAH with irritation and swelling that may increase the risk of seizures. The normal circulation of fluid within the brain may become disrupted, and the trapped fluid can cause dangerous pressure to build up within the skull.

**Your care will include ways to reduce the risks of side effects. These include:**

- Taking anti-seizure medications.
- Keeping the head of the bed at 30 degrees to reduce swelling.
- Frequently monitoring your brain function. Your health care team will do frequent “neuro checks” during the day and night. They will ask you to answer simple questions and demonstrate movement and strength. These checks provide valuable information for your care team.

## PREVENTING CEREBRAL VASOSPASM

After initial treatment of SAH, you are still at risk for cerebral vasospasm, a development that carries the danger of a secondary stroke.

Cerebral vasospasm is a condition where the artery’s walls react to the original bleeding and tighten up. This tightening narrows the space inside the artery and reduces the amount of blood that can flow through it. This is like what happens when someone steps on a garden hose. The reduced blood flow can cause a drop in the oxygen and nourishment that the artery is able to deliver to brain tissues, which might cause a new stroke.

The exact cause of vasospasm is not known. It tends to occur four to 10 days after the original SAH, but the risk period may extend to 21 days. The risk of vasospasm seems to be related to the amount of bleeding within the subarachnoid space.

Early signs of cerebral vasospasm may be:

- drowsiness
- confusion
- changes in speech
- changes in strength
- headaches that become more severe
- other symptoms, unique to individual patients

Most patients with SAH stay in the hospital for several weeks. Every case is unique and depends on the size and location of the hemorrhage (bleed). Sometimes the stay lasts longer to allow our health care team to observe you closely for vasospasm or other possible problems.

It is important that you know how to recognize and act upon any signs of another SAH. Very often, the key phrase associated with SAH is “the worst headache of my life.”

Even without pain, any of the following symptoms may indicate a stroke or a SAH:

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

**If you have one or more of these symptoms, immediately call 911 so an ambulance will be sent for you quickly.**

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For more information, contact  
The Brain Aneurysm Foundation  
at [www.bafound.org](http://www.bafound.org).

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## CHANGES AND COMPLICATIONS

In most cases, symptoms do improve after a stroke. The speed and level of your recovery depends on the extent of the brain injury and your ability to respond to rehabilitation. A stroke may affect how you move, feel, think and act. The highest priorities of care after a stroke are to prevent complications from the present stroke and to prevent another one.

Some of the physical effects and complications of a stroke can include:

- **hemiparesis** – weakness on one side of the body
- **hemiplegia** – paralysis on one side of the body
- **aphasia** – difficulty getting your words out or understanding what is being said
- **dysphagia** – trouble swallowing which can lead to breathing problems and pneumonia if not treated
- **dysarthria** – difficulty speaking or slurred speech
- **decreased field of vision, vision loss or double vision**
- **deep vein thrombosis (DVT)** – blood clots in veins of the legs because of decreased movement after a stroke
- **cerebral edema** – swelling of the brain after a stroke

## EMOTIONS AND BEHAVIOR AFTER A STROKE

In addition to physical changes and complications, people often experience emotional and behavioral changes. Changes from a stroke may make a person forgetful, careless, irritable or confused. Stroke survivors may also feel anxiety, anger or depression.

After a stroke, almost all patients feel tired at some point. Recovering from a stroke may require working harder to compensate for the loss of normal functions. Your health care team is here to partner with you in your care and provide tools to aid in your recovery.

Some common things to happen after a stroke include:

- **Less energy** – Stroke survivors may have less energy than before because of sleeping poorly, not getting enough exercise, poor nutrition or the side effects of post-stroke medications.
- **Using energy differently** – Because of the effects of a stroke, many things, like dressing, talking or walking, take a lot more effort. Changes in thinking and memory take more concentration.
- **Emotional changes** – Stroke survivors may feel more tired due to emotional changes. Coping with frustration, anxiety, anger and sadness can be draining. Often, loss of energy, interest, enthusiasm or decreased physical intimacy occurs along with a depressed mood.
- **Clinical depression** – Depression is a treatable illness that happens to many stroke survivors. Symptoms include significant lack of energy, lack of motivation and problems concentrating or finding enjoyment in anything. It is important to seek treatment for these symptoms early as it can affect your ability to recover from the physical symptoms of your stroke. If you find yourself having these symptoms, talk with your health care provider as there are treatment options available.
- **Re-entering the community after stroke**  
It is natural to be concerned about going back to social activities after your stroke. However, this is one of the most important pieces to recovery. The more social support you have, the better your chances for recovery after stroke and a lower rate of depression.

# CHANGES IN SPEECH, LANGUAGE OR SWALLOWING ABILITIES

Stroke can trigger a decreased ability to communicate by affecting the strength of the muscles that control the tongue and lips (dysarthria) or by changing the messages sent by the brain to the tongue and lips (apraxia). Stroke survivors may have trouble with swallowing (dysphagia). New weakness from a stroke may affect the tongue, lips and throat muscles that are needed for swallowing.

Aphasia is a change in language function that can impact the ability to understand what others are saying, as well as interfere with the ability to express ideas. After a stroke, you may struggle to find the words you want to use to form sentences for conversation. People with aphasia may have difficulty reading, writing or using numbers.

People with aphasia are often frustrated because they cannot speak as well or understand things the way they did before their stroke.

## It may be helpful for family members to:

- be open about the speech changes so other people can better understand the situation
- use sentences that are short and clearly worded
- remember to treat the stroke survivor normally and include them in conversations and decision making
- be patient and give stroke survivors the time they need to speak and get their point across

These conditions are treatable and can be improved through speech, language and swallowing rehabilitation. Evaluation and treatment will begin with a speech and language pathologist while admitted to the hospital and may continue throughout hospitalization and recovery.

## REHABILITATION

It is important to remember that most stroke patients improve over time. Physical, occupational and speech language therapists help stroke survivors work to rehabilitate after a stroke. The goals of rehabilitation are to increase independence, improve physical function and maintain a satisfying quality of life.

**Your rehabilitation team during your hospitalization and after your discharge may include:**

- physical therapist (PT)
- occupational therapist (OT)
- speech and language pathologist (SLP)
- physiatrist
- psychiatrist or psychologist

**Rehabilitation programs often focus on:**

- activities of daily living such as eating, bathing and dressing
- mobility skills such as transferring, walking or using a wheelchair
- communication skills
- improving swallowing and eating capabilities
- cognitive skills such as memory and problem-solving
- social skills and interacting with other people
- coping skills and treatment to help manage depression

# HOSPITAL DISCHARGE

Transitioning from the hospital into a new setting can be overwhelming. While you are in the hospital, your health care team will collaborate with you, your family and friends to assess the amount of care and rehabilitation you may need and the safest plan for your recovery.

These factors are important to consider when determining the best plan for your recovery:

- ability to care for yourself
- ability to follow up with your health care team
- access and support from a caregiver, someone who is willing and able to help when needed
- ability to communicate your needs
- ability to move around in your home and community

Common discharge considerations:

- **Safety** – Look around your home and eliminate anything that might be dangerous. This can be as simple as taking up throw rugs, testing the temperature of bath water or wearing rubber-soled shoes to prevent slips and falls. It may also be necessary to install handrails in your bathroom or other areas.
- **Accessibility** – You need to be able to move freely within the house. Modifications can include rearranging the furniture for easier movement or building ramps.
- **Independence** – Your home should be modified so you can be as independent as possible. This can mean adding adaptive equipment like grab bars or transfer benches in certain areas of your home.

Discharge locations may include:

- **Home with health care services** – Wide range of health care services provided in the home for an illness or injury.
- **Inpatient rehabilitation (IPR)** – Provides intensive inpatient rehabilitation therapy. Patients entering this setting will need to have the ability to tolerate up to three hours of therapy.
- **Extended care facility/skilled nursing facility (ECF/SNF)** – Designed for those individuals who need assistance with day-to-day activities or with medical needs. An ECF/SNF is needed when someone has a condition that is likely to last for a longer period.
- **Sub-acute rehabilitation care (SAR)** – Care designed for someone who has an acute illness, injury or worsening of a chronic disease process. It is goal-oriented rehabilitation immediately after acute hospitalization.



If you have questions about these locations, please speak with your care manager or nurse.



# SUPPORT DURING RECOVERY

The support of family and friends is important to the recovery of stroke survivors. While recovering, it is common to experience an adjustment period due to changing roles in addition to any physical or emotional changes. It is important to return to previous enjoyable activities in the community because this involvement helps to improve recovery.

## Common responsibilities of the support system after a stroke include:

- providing physical help with personal care and transportation
- managing financial, legal and business affairs
- monitoring behavior to ensure safety
- managing housework and meal preparation
- coordinating health care and monitoring medications
- helping the survivor maintain learned rehabilitation skills and work to improve them
- providing emotional support for the individual and family members
- encouraging the individual to be as independent as possible

## During recovery, constructive and effective communication is key to success:

- when talking to family and friends, talk openly about your fears, concerns and needs
- when talking to health care professionals, write all your questions down to make sure your questions are addressed - it may be helpful to take someone with you to appointments to help ensure complete understanding of questions and answers
- be willing to accept all forms of communication as equally valid including gestures, writing, drawing, notebook and speech

## The following resources may be available in the community:

- **adult day care** – professional supervision of adults in a social setting during the day
- **meal programs (such as Meals on Wheels)** – sponsored nutrition programs
- **home health aide service** – in-home personal care assistance that families may pay for privately
- **respite care** – a service that provides caregivers with an opportunity for a break

## The National Family Caregivers Association offers these tips for caregivers and support system members:

- advocate for your needs as well as those of your loved one
- remember to take some quality time just for you
- watch out for signs of depression and don't delay in getting professional help when you need it
- when people offer to help, accept the offer and suggest specific things they can do
- educate yourself about your loved one's condition
- be open to new technologies and ideas that promote your loved one's independence – there's a difference between caring and doing
- seek support from other caregivers – there is great strength in knowing that you are not alone





# RISK FACTORS

Knowing your stroke risk factors is the first step in preventing a stroke. Risk factors are divided into two groups – risk factors that can be modified by behavioral changes and risk factors that cannot be modified by behavioral changes. It is important to follow up regularly with your health care team to develop a plan to decrease your risk of stroke by better controlling your risk factors.

## HIGH BLOOD PRESSURE

The medical name for high blood pressure is hypertension. High blood pressure means that the force of the blood pushing against the sides of your arteries is consistently higher than it should be. This can lead to stroke, heart attack, heart failure or kidney failure.

High blood pressure is called the “silent killer” because it usually has no symptoms and is the number one modifiable risk factor. One in every three adults has high blood pressure and it may be undiagnosed. Not treating high blood pressure is dangerous as it increases the risk of both heart attack and stroke. Make sure you have your blood pressure checked regularly and treat it the way your health care provider advises. Blood pressure goals will vary based on the type of stroke you experienced and your individual risk factors. Ask your health care provider what an appropriate blood pressure is for you.

**Risks for high blood pressure can include:**

- family history of high blood pressure
- ethnicity (African-American, Hispanic or Native American)
- being overweight or obese
- using tobacco products
- diabetes or kidney disease

Your health care provider may prescribe one or more medications to lower your blood pressure. More than one medication may be ordered as they each work in different ways to keep your blood pressure under control.

**Medications for blood pressure control include:**

- **Diuretics** remove excess sodium (salt) and water to help control blood pressure, sometimes known as “water pills.”
- **Beta blockers** reduce the heart rate and the heart’s output of blood, which lowers blood pressure.
- **Calcium channel blockers** decrease the flow of calcium into muscle cells in the heart and arteries which causes them to relax and open. This lowers blood pressure.

## ATRIAL FIBRILLATION

Atrial fibrillation is a common heart rhythm disorder associated with an increased risk of ischemic stroke.

Atrial fibrillation occurs when the top chambers of the heart (atria) quiver instead of beating in a coordinated fashion. When the atria quiver instead of contracting normally, this causes abnormal blood flow. This can lead to formation of clots that can travel to your brain and cause a stroke.

Atrial fibrillation can be seen in patients with valve disease, coronary heart disease, thyroid disease, heart attack or heart failure. It is important to know that some people do not experience symptoms from their atrial fibrillation.

**Some symptoms of atrial fibrillation are:**

- irregular and rapid heart beat
- heart palpitations or thumping inside your chest
- shortness of breath
- dizziness, sweating or chest pain
- anxiety
- fainting
- fatigue with activity

Your provider may order an electrocardiogram (ECG) to determine if you have atrial fibrillation. However, some people may require a longer-term monitor, such as a wearable or implantable event monitor (loop recorder) to help diagnose their atrial fibrillation.

Treatment options for atrial fibrillation include:

- **Blood thinners/anticoagulants** – medications that decrease the chances of forming a clot that could lead to a stroke
- **Cardioversion** – an electric shock is given to the heart to help your heartbeat return to normal by interrupting the abnormal electric pattern
- **Antiarrhythmic medications** – medications that decrease your heart rate and may help your heart beat in a regular rhythm
- **Ablation** - your physician uses directed heat, cold or radio energy through a catheter to scar some tissue inside your heart, where to irregular beats are triggered; this enables the heart to beat regularly

## HEART DISEASE

Most strokes and heart attacks are due to atherosclerosis (the accumulation of plaque in an artery). Plaque is made up of fat, cholesterol and calcium that the body views as inflammation. The plaque in your vessels can rupture or lead to narrowed blood vessels which may cause a stroke. Cholesterol reducing medications, such as statins, help to decrease the inflammation from plaque and reduce the formation of new plaques. However, the best treatment for this is prevention. Some ways to prevent plaque formation include eating healthy, being physically active, avoiding tobacco products, controlling your blood pressure and maintaining a healthy weight.

## DIABETES

Diabetes is a condition in which glucose generally cannot be used by your body properly. Normally, food is broken down into glucose to be used by the cells for energy. Insulin, a hormone produced by the pancreas, takes the sugar from the bloodstream, and transports it into body cells to use for energy. In a person who has diabetes, the pancreas is not producing enough insulin or the body is not using it effectively. Diabetes is a major risk factor for stroke and heart disease because it negatively affects your blood vessels and how they function.

If you have diabetes, you need to learn about the disease and how to manage it. Important steps to managing your diabetes and reducing your risk of stroke are monitoring your blood sugar, controlling your weight and cholesterol, being physically active, lowering your blood pressure and avoiding tobacco products.



## HIGH CHOLESTEROL

Cholesterol is found in the bloodstream and carried to your body's cells by lipoproteins. High cholesterol levels can lead to heart disease and stroke.

Cholesterol comes from two sources. It is made in your body by the liver and it can be found in foods that have high levels of saturated and trans fats.

Low-density lipoprotein (LDL) cholesterol is the bad cholesterol because it contributes to plaque formation in the arteries. High LDL can lead to atherosclerosis and stroke.

High-density lipoprotein (HDL) is the heart healthy cholesterol that carries harmful cholesterol away from the arteries and helps protect you from heart attack and stroke.

### Ways to lower bad cholesterol (LDL) include:

- Participate in physical activities for at least 30 minutes on most or all days of the week.
- Eat more foods low in saturated fat and high in fiber. Try to increase your intake of fresh fruits and vegetables, whole grains, beans and legumes, lean meats and poultry without skin, fatty fish, nuts and seeds.
- Maintain a healthy weight.

Some people may need to take medications as well because changing their diet and activity level may not be enough. These medications, such as statins, help to decrease the inflammation from plaque and reduce the formation of new plaques.

## CAROTID ARTERY STENOSIS (NARROWING)

Carotid artery stenosis, also called carotid artery disease, is a narrowing of the main arteries in the neck that supply blood to the brain. Carotid artery stenosis occurs when there is a gradual buildup of plaque inside the blood vessel. As the size of the plaque increases over time, a significant blockage may result.

If you have one or more of the following risk factors, you can treat your risk factors to prevent or control carotid artery disease:

- high cholesterol
- obesity
- high blood pressure
- physical inactivity
- tobacco use
- unhealthy diet
- diabetes

Your provider may order a carotid artery ultrasound called a carotid duplex or doppler. This non-invasive diagnostic test takes images of the blood flowing through the arteries and it can detect how severe the narrowing is from plaque buildup. If needed, CT angiography can also be performed to evaluate the degree of carotid artery stenosis.

Treatment for carotid artery disease varies depending on the severity of the disease, but may include lifestyle changes, medications and surgical procedures. You will need to work with your health care provider to develop a plan to address your specific risk factors.

### Carotid endarterectomy (CEA)

This is an open surgical procedure commonly performed by a neurosurgeon or vascular surgeon. The surgeon removes the plaque that is causing the carotid artery to be narrowed or blocked and repairs the artery by placing a graft or patch.

### Carotid angioplasty/stenting

A neuro-radiologist or cardiologist uses diagnostic imaging and a catheter. This may be an alternative to open surgery for select patients.

## LIFESTYLE FOR PREVENTION OF STROKE

### Lifestyle changes

A healthy lifestyle plays a big part in improving recovery and prevention of stroke. Here are some ways that will help:

- Don't use tobacco products.
- By eating healthy foods and becoming increasingly physically active, you are more likely to reach and maintain a healthy body weight and improve overall health.
- Get your blood pressure checked regularly and partner with your provider to help control your blood pressure.
- Reach and maintain a healthy weight, which is important for overall health.
- Decrease your stress level.

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**Beaumont is here to provide resources and partner with you** to help you succeed in making positive lifestyle changes.

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## TOBACCO CESSATION

No matter how much or how long you have been a smoker, when you quit, your risk will immediately drop and continue to drop over time.

If you use tobacco products or are exposed to secondhand smoke, your risk of stroke, lung cancer and heart disease is increased. Using tobacco products tops the list as the most preventable major risk factor for heart and blood vessel disease, the number one contributor to stroke.

There are some great resources to help you quit. We understand that quitting is a life changing event and can be very difficult, but there is support available.



**CALL 800-QUIT-NOW  
OR VISIT SMOKEFREE.GOV**  
FOR MORE INFORMATION.

## A HEALTHY DIET & MAINTAINING A HEALTHY WEIGHT

What we eat makes a big difference to our health. We can help reduce our risk of stroke by maintaining a healthy body weight and eating a well-balanced diet high in fruits, vegetables and lean meats, and a diet low in salt and saturated fat.

Since blood pressure control is very important in the prevention of stroke, you may be asked to limit your salt (sodium). Salt allows you to hold onto fluid in your body, which increases your blood pressure. It may be necessary for you to learn how to read food labels to recognize those with high-sodium content.

More than 1/3 of American adults are overweight, making them more likely to develop heart disease and stroke, even if they have no other risk factors. Obesity is unhealthy because excess weight puts more strain on the heart, increases the risk of developing diabetes and raises blood pressure and cholesterol levels. Losing weight is one of the best ways to reduce your risk of heart problems and other diseases.



## PHYSICAL ACTIVITY

Physical activity is as important as your diet in helping you lose weight. Regular, moderate-intensity physical activity can lower your risk of:

- stroke
- heart disease and heart attack
- high blood pressure
- high total cholesterol
- obesity
- diabetes

If done consistently, you and your health can benefit from moderate to intense activities like these:

- brisk walking
- gardening and yard work
- moderate to heavy housework
- hiking or jogging
- stair climbing
- bicycling, swimming or rowing
- aerobic dancing or cross-country skiing

**Always check with your health care team prior to initiating a physical fitness program.**



# STROKE RECOVERY AND SUPPORT



For more information about stroke, to get fact sheets or speak with other survivors and caregivers, contact:

## **American Stroke Association**

888-4-STROKE

(888-478-7653)

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

## **National Stroke Association**

800-STROKES

(800-787-6537)

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



## DIABETES

### **American Diabetes Association**

800-ADA-DISC

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

### **Academy Nutrition & Dietetics Association**

312-899-0040

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

### **National Diabetes Education Program**

[ndep.nih.gov](http://ndep.nih.gov)



## FAMILY SUPPORT

If you need help taking care of yourself while caring for a loved one, ask for information at your health care provider's office. Be very specific when you ask family and friends for help in getting the time you need to take care of yourself. Join support groups and learn how others have managed the same problems or concerns you are having.

For information on caring for someone with stroke:

## **American Stroke Association**

888-4-STROKE

(888-478-7653)

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



## QUIT SMOKING

You can contact these organizations for more information on programs and methods to help you quit:

### **American Lung Association**

800-548-8252

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

### **American Heart Association**

800-242-8721

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



## NOTES

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# GLOSSARY

## **alteplase (tPA)**

See section on tissue plasminogen activator.

## **aneurysm (an'u-RIZ-m)**

Ballooning out of the wall of a blood vessel, usually an artery. It happens when the wall is weakened by disease, injury, or a problem present at birth.

## **angiography/arteriography**

A test in which dye is injected into blood vessels. The blood vessels are then examined using X-rays. The test can give the condition of veins and arteries. It can also warn health care providers if there are blood clots.

## **angioplasty (AN'je-o-plas-tee)**

A procedure for widening narrowed blood vessels using a thin tube called a catheter and a balloon tip.

## **anticoagulant (an'tih-ko-AG'u-lant)**

A drug that prevents blood from clotting. Often referred to as a blood thinner.

## **antiplatelet (an'tih-PLATE-let)**

Drugs that prevent platelets from sticking together and clotting the blood. Two examples are aspirin and clopidogrel (Plavix®).

## **aphasia (ah-faze-ee-ah)**

Difficulty in using or understanding language caused by damage to the communication centers of the brain.

## **apraxia (a-PRAK-see-uh)**

A motor deficit in which you have trouble making purposeful or skilled movements. It can affect all or some movements needed in speaking. It may also be called dyspraxia.

## **arrhythmia**

See dysrhythmia.

## **artery**

Any one of the blood vessels that carry blood from the heart to other parts of the body.

## **Aspirin (ASA)**

Aspirin affects the body in many ways, but one is to prevent blood platelets from sticking together and forming blood clots.

## **atherosclerosis (ath'er-o-skleh-RO'sis)**

A form of artery disease in which the inner walls of the blood vessels become thick and rough because of cholesterol deposits. The arteries become narrower and less blood can flow through them. This buildup of deposits is sometimes called atheroma or plaque.

## **atrial fibrillation**

Very fast, irregular pumping of the heart muscle in the upper chambers (the atria). As a result, the heart can't pump blood around the body effectively.

## **AVM (Arteriovenous Malformation)**

(ar-tir'e-o-ve-nus)

Arteriovenous malformations are small blood vessels that are abnormally linked. The unusual connection between arteries and veins creates a mass of abnormal blood vessels called a nidus (Latin for "nest"). The nidus can expand and push up against normal brain tissue, which can cause weakness, numbness, loss of vision or seizures. If the nidus ruptures, it causes a type of bleeding stroke called an intracranial hemorrhage.

## **blood clot**

A jelly-like mass of blood cells formed by substances in the blood. Blood clots can form inside an artery if plaque deposits damage it.

## **blood sugar/blood glucose**

The level of sugar in the blood. The body needs some sugar in the blood for energy. Too much sugar, in conditions like diabetes, can injure the walls of the arteries and increase the risk of stroke.



**cardiac**

Pertaining to the heart.

**cardiovascular disease**

Disease of the heart and blood vessels, including coronary artery disease, stroke, rheumatic heart disease and high blood pressure.

**carotid artery**

A major artery in the neck that carries blood to the brain.

**carotid doppler**

A noninvasive test that uses high-frequency sound waves to determine extent of blood flow through the carotid arteries in the neck.

**carotid endarterectomy** (end'ar-ter-EK'to-me)

Surgery to remove plaque deposits or blood clots in the carotid arteries.

**catheter** (KATH'eh-ter)

A thin, flexible tube that can be inserted into the blood vessels of the body. Catheters are used for many diagnostic and non-surgical procedures, such as angiography and angioplasty.

**cerebral**

Pertaining to the brain.

**cerebral embolism**

A blood clot that is formed in one part of the body and is carried by the bloodstream to the brain. It lodges in an artery, cutting off blood flow.

**cerebral hemorrhage**

Bleeding in the brain resulting from a burst aneurysm or head injury.

**cerebral thrombosis**

A blood clot that forms in an artery which supplies part of the brain.

**clot-buster**

A drug that breaks up clots in the blood vessels. An example of a clot busting drug is tissue plasminogen activator (t-PA).

**cognitive**

Pertaining to thinking and understanding.

**coronary artery disease (CAD)**

Results from the development of atherosclerosis (plaque) in the arteries that supply the heart. Atherosclerosis develops slowly and is the underlying problem leading to heart attack.

**CT scan or CAT scan**

(computerized tomography) (to-MOG-rah-fe)

A test for evaluating the brain and other body organs. A CT scan can usually identify whether a stroke was due to bleeding or a blockage.

**diabetes**

A disease in which the body doesn't properly produce or use insulin. Insulin is a hormone produced and needed for daily life. Diabetes increases the risk of developing cardiovascular disease.

**diastolic blood pressure**

The lowest blood pressure that can be measured as blood flows through the arteries. It occurs when the heart muscle relaxes between beats.

**doppler test**

A test that uses sound waves to listen to the blood moving through the blood vessels. Doppler tests can be used to identify blood vessels that are narrowed or blocked.

**dysarthria** (dis'ART're-eh)

A speech problem caused by weakness, slowness or poor coordination of the muscles used for speaking.

**dysphagia** (dis-FA'-je-ah)

Difficulty swallowing, caused by muscle weakness or a lack of sensation in the mouth.

**dyspraxia**

See apraxia.

**dysrhythmia**

An abnormal heart rhythm, sometimes called an arrhythmia.

**echocardiography**

A test that uses ultrasound (non-harmful sound waves) to make images of the heart chambers, valves and surrounding structures.

**ECG or EKG**

Short for electrocardiogram. A graph of the electrical impulses produced by the heart.

**EEG (electroencephalogram)**  
(e-lek- tro-in-sef-a-la-gram)

A test that tracks the electrical activity in the brain.

**embolic stroke**

Occurs when a brain artery is blocked by a blood clot that has formed somewhere else in the body. The clot usually forms in the heart or neck arteries. It is carried through the bloodstream to the brain.

**hemiplegia**

Paralysis on one side of the body. It can also be called hemiparesis.

**hemorrhage**

Bleeding from a burst blood vessel.

**hemorrhagic (HEM-or-RA-jik) stroke**

A stroke that happens when an artery wall bursts in or around the brain.

**hypertension**

Also known as high blood pressure. A chronic increase in blood pressure above the normal range. Blood pressure is high when it is 140/90 or above on several measurements.

**intracerebral (in-tra-she-Re-bral)**

Within the brain tissue.

**hemorrhage (ICH)**

Occurs when an artery in the brain bursts. The leaked blood presses on the brain tissue, destroying it.

**ischemia**

Decreased blood flow to an organ. It is usually caused by narrowing or blockage of an artery.

**ischemic stroke (iz-KEM-ik)**

A stroke that happens when a blood clot forms on plaque that has built up on an artery wall. If the clot blocks an artery in the brain or an artery that supplies blood to the brain, the result is an ischemic stroke.

**magnetic resonance imaging (MRI)**

A test used to examine the brain and other parts of the body. MRI uses non-harmful magnetic field and radio waves to produce an image of a part of the body.

**motor function**

The movement of muscles with the intent to perform a specific act.

**neurologist**

A doctor who specializes in diagnosing and treating diseases of the brain and other parts of the nervous system.

**plaque**

Also called atheroma. It is a buildup of fatty substances in the inner lining of the artery wall. It occurs in atherosclerosis.

**platelet**

A type of cell found in the blood. It aids in the clotting of the blood.

**radionuclide angiography**

A test for taking pictures of the brain. A harmless radioactive substance is injected into a vein and pictures are taken when it reaches the brain.

**risk factor**

A risk factor is the increased chance that you will develop a condition, such as stroke. Some risk factors are present at birth, some are the result of normal changes such as ageing and some are the result of lifestyle choices, like smoking.

**sensory function**

Pertaining to the senses: sight, smell, taste, touch and hearing.

**stroke**

The sudden interruption of the blood supply to the brain. It can be caused by either a blockage or bursting of blood vessels. Older terms for stroke include apoplexy and cerebrovascular accident (CVA).

**subarachnoid** (sub'ah-RAK'noid)

The space between the layers of the brain.

**hemorrhage**

A stroke caused by bleeding on the surface in the brain. The blood gathers in the area between the brain and the skull.

**systolic blood pressure**

The highest blood pressure that can be measured as blood flows through the arteries. It is the upper number of a blood pressure reading. It occurs when the heart muscle contracts.

**thrombolysis**

The breaking up of a blood clot.

**thrombolytic agents** (throm'bo-LIT'ik)

Drugs that work by dissolving blood clots in arteries. Also known as clot-busters.

**thrombotic stroke**

A stroke caused by a blood clot or thrombus that forms in an artery going to the brain. The clot blocks the blood supply to a part of the brain.

**tissue plasminogen activator (tPA)**

A natural protein that works by breaking up blood clots in arteries, restoring blood flow. Other names include alteplase and Activase®.

**transient ischemic attack (TIA)**

Sometimes called a mini stroke. It is caused by temporary blockage of a blood vessel. It does not cause permanent brain damage. Symptoms of TIAs are the same as for a stroke, but usually last 24 hours or less. TIAs are an important warning sign of a stroke and should never be ignored. Prompt medical attention could prevent a major stroke from occurring.

**Warfarin** (Coumadin®)

An anticoagulant that works by preventing blood clotting agents from forming in the liver.



# Beaumont





FOR MORE INFORMATION  
**CALL 855-8-NEURO-1 (855-863-8761).**

A downloadable version of this book  
is available at **[beaumont.org/stroke](http://beaumont.org/stroke)**.



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**[beaumont.org](http://beaumont.org)**