STROKE: EDUCATION, RECOVERY AND PREVENTION
Time is Brain

If you think that you or a loved one is having a stroke, remember to act F.A.S.T.

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

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

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

**TIME**
- If you observe any of these signs, call 9-1-1 immediately!
This booklet is not meant to substitute for the advice and counsel of your doctor. If you have any questions, please ask your doctor.

Educational contents of this booklet have been provided to you by the American Heart Association and National Stroke Association.

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Welcome

We know that any hospitalization for you or a family member can be stressful, but it can be particularly overwhelming when it involves your brain.

You may be asking yourself what happened? Or how did I end up here? Or why did I have a stroke?

This book is designed to provide you and your family with information regarding stroke, both ischemic and hemorrhagic, and transient ischemic attacks (known as a TIA), the risk factors that contribute to them and the recovery process. We hope that you and your family will use this booklet as a guide in answering some of the questions or concerns that you may have. If you have more questions, please ask your doctor or nurse.

Your health care team

Our extensive health care team will be working closely with you following your stroke to plan your care once you leave the hospital. Our goal is to help you return to your optimal level of activity before your stroke. Members of your health care team will include:

Physician staff
Your doctor(s) will direct the care you receive during your hospital stay. This team may include neurology, internal medicine, neurosurgery or critical care physicians.

Mid-level providers
A team of neuroscience-trained nurse practitioners and physician assistants that work in direct collaboration with your doctor will be your liaisons and help oversee your care while in the hospital.

Nursing staff
Registered nurses and nursing assistants will coordinate and oversee your care and the teaching you will receive throughout your hospital stay. They work closely with your doctors and other team members and will inform them of any change in your condition as well as progress made.

Your doctors, mid-level providers and nursing staff are committed to showing you and your family courtesy and respect, listening to your questions and concerns carefully and taking the time to explain things to you in a way that is understandable. Please consult them if you have any issues while in the hospital, especially if you are experiencing any pain.
**Respiratory therapy**
A respiratory therapist may evaluate your need for oxygen and give you breathing treatments if ordered by your doctor. The therapist may also teach you about your oxygen levels, breathing treatments and/or any other concerns related to your breathing.

**Physical medicine and rehabilitation**
A physiatrist and physical therapist may be asked to evaluate you if you are having problems moving about and will be able to help you improve your activity and strength. An occupational therapist may assist you in improving your independence and safety with activities like grooming, feeding, dressing and bathing, tasks all considered activities of daily living.

**Speech and language pathology**
A speech pathologist will meet with you to evaluate your ability to swallow, communicate and speak, and offer improvement therapies if needed.

**Pharmacy**
A pharmacist may meet with you during your hospital stay to teach you about some of the medications your doctor could prescribe and may also be involved in monitoring your medications in the hospital.

**Nutrition**
A registered dietitian may meet with you to teach you about developing a diet plan to help you maintain a healthy weight. A dietitian can also help you with any other nutritional needs you may have.

**Care management**
A care management coordinator will assess your discharge needs when you are admitted to the hospital and will help you coordinate them before you leave. Your care coordinator will talk with you and your family regarding insurance coverage and other concerns you may have about returning home like home care, rehabilitation arrangements and equipment needs.

**Beaumont Home Health Services**
Beaumont Home Health Services can help you get back to your daily routine as soon as possible. The staff can provide the care you need through a variety of skilled and private hire services. Home services include nurses, home health aides, physical therapists, occupational therapists, speech and language pathologists, registered dietitians and social workers. They can also provide and deliver medical supplies to your home. Ask your care coordinator about Beaumont Home Services or call 248-743-9500 if you would like more information.

Once you return home, be sure to call for a follow-up appointment with your doctor. It is important to monitor your post-stroke progress even once you are home.
Facts about stroke

What is a stroke?
A stroke occurs when a blood vessel bringing blood and oxygen to the brain is interrupted or ruptures (bursts) and brain cells don’t get the flow of blood that they need. Deprived of oxygen, nerve cells can’t function and die within minutes. When nerve cells do not function, the part of the body they control can’t function either. The devastating effects of stroke are often permanent because dead brain cells can’t be replaced.

Blood supply to the brain
Blood vessels that carry blood to the brain from the heart are called arteries. The brain needs a constant supply of blood, which carries the oxygen and nutrients it needs to function. Each artery supplies blood to specific areas of the brain. A stroke occurs when one of these arteries to the brain either is blocked or bursts. As a result, part of the brain does not get the blood it needs, so it starts to die.

Motor and sensory function
The human brain is divided into several areas that control movement and sensory function, or 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. This can cause problems with walking, speaking, seeing or feeling.

Left and right hemispheres
The left side, or hemisphere, of the brain controls how the opposite (right side) of the body moves and feels, and is responsible for how well we can figure out problems with science, understanding what we read and what we hear people say, number skills such as adding and subtracting, and reasoning. The right side of the brain controls the movements and feelings on the left side of the body and is in charge of how artistic we are, including musical and creative talents.

Mechanism of normal and blocked artery blood flow
Normal artery – Blood flows easily through a clear artery.

Blockage – An artery can become blocked by plaque (a fatty substance that clogs the artery) or a blood clot, which reduces blood flow to the brain and may cause a stroke. In this picture, atherosclerosis (ath"er-o-skleh-RO’sis), a hardening of the arteries, is caused by cholesterol or plaque build-up.

Blockage cleared – The plaque or blood clot breaks up quickly and blood flow is restored to the brain. This may happen during a TIA or mini-stroke, where brain cells recover with no permanent brain damage.
Types of stroke

There are two main types of stroke: strokes caused by blood clots (TIA/ischemic) and bleeding stroke (hemorrhagic).

**Transient ischemic attack**

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. Also called a mini-stroke, TIA can cause symptoms such as numbness, trouble speaking, and loss of balance or coordination. It is common for these symptoms to last for a very short period of time and then resolve. While TIAs cause no permanent brain damage, they are a serious warning sign and precede about 15 percent of all strokes and should not be ignored.

**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 and stroke sufferers will start to have problems using certain parts of their bodies or completely lose some abilities.

Facts about ischemic stroke:

- the most common type of stroke and account for about 85 percent of all stroke cases
- symptoms develop over a few minutes or worsen over hours
- typically 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
- TIA or “mini stroke” may give some warning of a major ischemic stroke

There are three types of ischemic stroke categorized by their specific cause:

**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. This is common in arteries damaged by arteriosclerosis.

**Systemic hypoperfusion** – means low blood flow and occurs because of circulatory failure caused by the failing of the heart’s pumping action (heart attack) and too little blood reaches the brain.
Hemorrhagic stroke

Strokes caused by a bursting blood vessel in the brain that spills blood into the brain are called hemorrhagic (hem-o-RAYG-ik) strokes. High blood pressure and brain aneurysms can both cause the blood vessel to be weak and possibly cause this type of stroke.

Facts about hemorrhagic stroke:
- Fatality rate is higher and overall prognosis poorer for those who have hemorrhagic strokes
- People who have hemorrhagic strokes are usually younger
- Often associated with a very severe headache, “worst headache of my life”, stiff neck, inability to tolerate bright lights (photophobia), nausea and vomiting and the symptoms usually appear suddenly
- TIA or any other stroke warning sign may not precede this type of stroke

There are two types of hemorrhagic stroke categorized by their specific cause:

**Intracerebral hemorrhage** – a type of hemorrhagic stroke, is caused when a burst blood vessel bleeds deep into the brain tissue. High blood pressure, also called hypertension, is the most common cause of this type of stroke. The bleeding causes brain cells to die, and that part of the brain no longer works correctly.

**Subarachnoid hemorrhage** – a blood vessel bursts near the surface of the brain and blood pours into the area between the brain and the skull. This bleeding may increase pressure in the brain, injuring brain cells. This type of stroke has many possible causes, but is usually the result of a burst aneurysm or an arteriovenous malformation, or AVM.

**Aneurysm** – a weak spot on the wall of an artery that may balloon out, forming a thin-walled bubble. As it gets bigger, the aneurysm gets weaker and can burst, leaking blood into or outside of the brain.

**Arteriovenous (ar-tir”-e-o-ve-nus) malformation** – an irregular connection of arteries and veins in the brain that can rupture.
Diagnosis and treatment
Signs and symptoms
What are the warning signs of 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 9-1-1 immediately if you or a family member experiences these warning signs.

Diagnosing a stroke
It is critical to diagnose a stroke as soon as possible, as the treatment for stroke depends on the type and source of the stroke, location of the injury to the brain and how long the brain tissue has been without blood supply.

Other conditions may have symptoms similar to stroke and may need to be ruled out in order to diagnose a stroke. Some of these conditions include seizures, fainting, migraine, heart problems or other general medical conditions.

In the emergency room, your 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 to help determine what kind of stroke you are having
• request additional tests that might be needed

Imaging tests
CT scan (computed tomography)
An imaging test of the brain that uses radiation to create a picture (like an X-ray) of the brain. It’s usually one of the first tests given to a patient with stroke symptoms as test results give valuable information about the cause of stroke and the location and extent of brain injury.
**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 brain injury. The image produced by MRI is sharp and detailed, so it’s often used to diagnose small, deep injuries.

**Echocardiogram**

An ultrasound imaging procedure used to assess the heart’s function and structures. It can be used to check for conditions such as heart disease, congenital birth defects, heart failure, pericarditis (an inflammation of the lining of the heart) or disease of the valves which might identify the cause of the stroke.

**TEE**

A transendoscopic echocardiogram, which looks at the same structures as a regular echocardiogram but is performed using an endoscope down the throat to look directly at the heart.

**CT Perfusion**

A regular CT scan that uses dye/contrast to look at all surrounding arteries, if needed, to quickly diagnose stroke, assess condition of the vessels and determine potential treatment.

**Blood flow tests**

**Carotid artery ultrasound**

A carotid artery ultrasound may be ordered if your doctor hears an abnormal sound over your carotid artery caused by disturbances in the blood flow. This diagnostic test takes images of the blood flowing through the arteries and it can detect how severe the narrowing is from plaque buildup.

**Cerebral angiography/cerebral arteriography**

A cerebral angiography/cerebral arteriography can be performed to diagnose and show the degree of carotid artery stenosis. This test feeds a catheter from your groin, through your aorta and into the carotid artery. An injectable contrast dye is then inserted into the artery while images of the area are captured. This dye allows your doctor to view the arteries in a more enhanced field of view to detect any vessel abnormality. This test is similar to a catheterization to the heart.
Treating a stroke

Treating ischemic stroke

Typical treatment for ischemic stroke includes medication therapy and close monitoring of a patient’s post-stroke status and vitals.

Drugs and acute hospital care are all accepted ways to treat an ischemic stroke. Tissue plasminogen activator, or tPA, is a clot-busting drug available for treatment. To receive tPA, a medical doctor must diagnose your stroke as an ischemic stroke, one caused by a clot, and treat you within 3 to 4.5 hours of the onset of symptoms. If more than 4.5 hours passes or other medical conditions are present, tPA cannot be given. Medication may also be used to treat brain swelling that sometimes occurs after a stroke.

Anticoagulants (AN-ti-KO-ag-u-lants) and antiplatelet (AN-tiPLAY-lit) medications interfere with the blood’s ability to clot. Anticoagulants delay the clotting of blood and antiplatelets keep blood clots from forming by preventing blood platelets from sticking together. These may be used to help patients prevent strokes that are caused by a clot.

Corkscrew-shaped products, like Merci Retriever or Penumbra, are designed to remove blood clots from large vessels within the neurovasculature in the brain. A catheter is inserted into the femoral artery, through the aorta and into the brain artery with the blockage. The device is then wrapped in and around the clot and removed through the catheter.

Treating hemorrhagic stroke

Hemorrhages (bleeding) in the brain may be life-threatening, thus hospital care is required. Medication can also be given to control high blood pressure and other medication may be prescribed to reduce the brain swelling that follows a stroke. Surgery may be needed depending on the cause of the hemorrhage to repair an aneurysm or remove a blood clot.

Aneurysm repair

Clipping

To clip an aneurysm, a neurosurgeon performs a craniotomy to expose the aneurysm. A small titanium clip is used to close off the base of the aneurysm and prevent further blood flow to the area.

Coiling

When coiling an aneurysm, a catheter is passed into the femoral artery in the groin, through the aorta and brain arteries, and finally, directly into the aneurysm. Platinum coils are then pushed through the catheter into the aneurysm and then released initiating a clotting or thrombotic reaction inside the aneurysm.

The type of surgical intervention required is based on aneurysm location, size and severity. For more information, please ask your neurosurgeon.
After a stroke
After a stroke

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. Your brain controls how you move, feel, think and act and a brain injury from a stroke may affect some of these abilities. Your doctor’s highest priorities after a stroke are to prevent complications from the present stroke and to prevent another stroke. This means that all complications must be treated and under control before rehabilitation can begin.

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
- **vision** – decreased field of vision and trouble with visual perception
- **deep venous thrombosis** – blood clots form in veins of the legs because of immobility from stroke
- **brain edema** – swelling of the brain after a stroke

In addition to physical changes and complications, people often experience emotional and behavioral changes.

Damages from a stroke may make a person forgetful, careless, irritable or confused. Stroke survivors may also feel anxiety, anger or depression. After a stroke, behavior depends on where and how badly the brain is injured. Many disabilities resulting from stroke improve with time. Behavior changes and emotional health can also improve.

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 (such as being unable to use an arm or hand). You’ll start to feel less tired as your recovery continues and strength is regained. It’s important to pinpoint what’s causing you to be tired so you can take action to manage it. You may feel tired after a stroke for four major reasons:

- **Less energy** – you may have less energy than before because of sleeping poorly, not getting enough exercise, poor nutrition or the side effects of your post-stroke medication
- **Using energy differently** – you might have as much energy as before, but you’re using it differently. Because of the effects of your stroke, many things, like dressing, talking or walking, take a lot more effort. Changes in thinking and memory take more concentration. You have to stay “on alert” all the time – and this takes energy.
• **Emotional changes** – you also may feel more tired due to emotional changes. Coping with frustration, anxiety, anger and sadness can be draining. Often, loss of energy, interest or enthusiasm occurs along with a depressed mood.

• **Clinical depression** – is a treatable illness that happens to many. Symptoms include significant lack of energy, lack of motivation, and problems concentrating or finding enjoyment in anything. Talk to your doctor about an evaluation for clinical depression if tiredness continues.

**Loss of speech, language or swallowing abilities**

Stroke can trigger a loss of ability to communicate by affecting the strength of the muscles that control the tongue and lips (dysarthria) or by disrupting the motor patterns sent by the brain to the tongue and lips (dyspraxia). Both disorders impact our ability to form the basic movements that allow us to speak.

Aphasia (ah-FAY-ze-ah) is a loss of language function that can impact your ability to understand what others are saying, as well as interfere with your ability to express yourself. After stroke, you may struggle to find the words you want to use to form sentences for conversation. Since we communicate in many ways, people with aphasia may have difficulty reading, writing or using numbers, as well.

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 problem so other people can better understand the situation

• check the patient’s understanding with “yes” or “no” questions

• use sentences that are short and to the point

• keep the noise level down and stand where the patient can see you

• remember to treat the stroke survivor as you normally would and include them in conversations and decision making

• be patient and give them the time they need to speak and get their point across

You use your tongue, lips and throat muscles primarily for swallowing. Stroke may also affect this function causing dysphagia or difficulty swallowing.

All of these conditions are treatable and can be markedly improved through speech, language and swallowing rehabilitation. Evaluation and treatment will begin with your Beaumont speech and language pathologist as soon as you are admitted to the hospital, and will continue throughout each phase of your hospitalization. Our extensive outpatient speech and language rehabilitation programs have changed many lives for the better, providing family education, daily treatment and support groups so patients and families can find the skills they need for healthy and productive daily living.
Rehabilitation

It is important to remember that most stroke patients **do get better**. One of the tools used to help make that possible is therapy, including physical, occupational and speech, among others. The goals of rehabilitation are to increase independence, improve physical function, help you maintain a satisfying quality of life and help you prevent another stroke.

Your rehabilitation team may include:

- **physiatrist** – medical doctor who specializes in rehabilitation
- **physical therapist** – specializes in maximizing mobility and independence to improve major motor and sensory impairments like walking, balance and coordination
- **occupational therapist** – focuses on helping rebuild skills in daily living activities like bathing, toileting and dressing
- **speech and language pathologist** – helps to restore language skills and also treats swallowing disorders
- **psychiatrist or psychologist** – help patients adjust to the emotional challenges and potential new circumstances of their lives

Rehabilitation programs often focus on:

- activities of daily living like eating, bathing and dressing
- mobility skills such as transferring, walking or self-propelling a wheelchair
- communication skills in speech and language
- recovering swallowing and eating capabilities
- cognitive skills like memory and problem-solving
- social skills and interacting with other people
- psychological function for coping skills and treatment to overcome depression
Hospital discharge

Leaving the hospital may seem overwhelming because so many things may be different, but your stroke care team will prepare you to move home or perhaps to another setting that can better meet your needs.

Going home poses few problems for people who have had a minor stroke and have few complications. However, for those who have had more severe strokes, going home depends on these factors:

- **Ability to care for yourself** – rehabilitation should be focused on daily activities.
- **Ability to follow medical advice** – it’s important to take medications as prescribed and closely follow your medical advice.
- **Access to a caregiver** – someone who is willing and able to help when needed should be available.
- **Ability to move around and communicate** – if patients aren’t independent in these areas, they may be at risk in an emergency or feel isolated.

Living at home successfully also depends on how well your home can be adapted to meet your needs.

**Safety** – Take a 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 be as simple as rearranging the furniture for easier movement or as dedicated as 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.

If your condition is not stable enough to return home, your doctor may recommend another type of facility that can better meet your post-stroke needs. It’s important that the living place you choose is safe and supports your continued recovery. After care facilities can include:

**Extended care facility** – Designed for those individuals who need assistance with day-to-day activities or with medical needs. An extended care facility is needed when someone has a condition that is likely to last for a long period of time.

**Sub-acute care** – Comprehensive inpatient care designed for someone who has an acute illness, injury or exacerbation of a disease process. It is goal-oriented treatment rendered immediately after, or instead of, acute hospitalization to treat one or more specific active complex medical conditions, or provide rehabilitation services.

**Assisted living** – This is for people who can live somewhat independently but need some assistance with things like meals, medication and housekeeping.

If you have any questions about these locations, please speak with your care management coordinator.
Family support

People who provide help for stroke survivors are often called caregivers. Everyone involved in helping is a caregiver – spouse, family members and friends. It’s important that caregivers and stroke survivors strive to be partners in their recovery efforts. It’s often a challenge for both to adjust to their changed roles, and the adjustment may be easier if both parties share in decision-making and share their feelings honestly.

Common responsibilities of caregiving 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 patient and family members
• encouraging the patient to be as independent as possible

As a caregiver, you have to communicate with many people including your loved ones, family, friends, co-workers, bosses, health care professionals and insurance companies. Constructive and effective communication is key to your success. Although your time and patience may be stretched thin, it’s important to stay organized, separate your emotions from your conversations and keep on the subject for each person you talk to. Here are some simple guidelines to help you stay focused and get the best results:

• When talking to your family, talk openly about your fears, worries and needs and remember that everyone is feeling the pressure and insecurity of the situation so try to be patient.

• When talking to health care professionals, write all your questions down to make sure you get all topics covered and try to separate your anger and frustration about the situation from your feelings about the doctor; remember, you are both on the same side

• When talking to your loved one, give both of you time to accept what has happened and realize that your roles may have changed and understand that stroke can have a big impact on your loved one’s ability to communicate, especially if your loved one has aphasia. Be willing to accept any and all forms of communication as equally valid including gestures, writing, drawing, notebook, intonation and speech.
Many people find caring for another person very rewarding. However, there are times when post-stroke needs can be too much for any one person. There are resources available in the community that can help like:

**Adult day care** – professional supervision of adults in a social setting during the day

**Adult foster homes** – supervised care in approved and licensed private homes

**Meal programs (such as Meals on Wheels)** – sponsored nutrition programs

**Home health aide service** – in-home personal care assistance

**Homemaker assistance** – supervised, trained personnel to help with household duties

**Respite care** – people come into the home for a limited time to give caregivers a break

The National Family Caregivers Association offers these tips for family caregivers:

- Choose to take charge of your life and don’t let your loved one’s illness or disability always take center stage.
- Remember to be good to yourself. Love, honor and value yourself. You’re doing a very hard job and you deserve 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. Information is empowering.

- There’s a difference between caring and doing. Be open to new technologies and ideas that promote your loved one’s independence and help you do your job easier.
- Trust your instincts. Most of the time they’ll lead you in the right direction.
- Grieve for your losses and then allow yourself to dream new dreams.
- Stand up for your rights as a caregiver and as a citizen.
- Seek support from other caregivers. There is great strength in knowing that you are not alone.

A stroke can change a person’s life forever; your loved one may even be disabled or have difficulty communicating. It is important for you to get support, have patience and be prepared to create a different way of life for you and your loved one. Learn everything you can about their condition and help them get back into life.
Risk factors
Risk factors for stroke

Knowing your risk for stroke is the first step in preventing stroke. You can change or treat some risk factors, but others you can’t. By having regular medical checkups and knowing your risk factors, you can focus on what you can change to lower your risk of stroke.

Modifiable risk factors you can change:
- high blood pressure
- diabetes mellitus
- high cholesterol
- tobacco use
- poor diet
- physical inactivity and obesity
- illegal drug use

Non-modifiable risk factors that can’t be changed:
- prior stroke or TIA, or family history
- atrial fibrillation
- carotid artery disease
- heredity and race
- certain blood disorders
- age
- gender

High blood pressure

The medical name for high blood pressure is hypertension (hi-per-TEN-shun). 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.

Adult blood pressure reading of:
- 120/80 or less is normal
- 123-139/80-89 is “pre-hypertensive” and requires lifestyle modifications to reduce the risk of cardiovascular disease
- 140/90 or higher is hypertensive

High blood pressure is also called the “silent killer” because it usually has no symptoms. One in every three adults has high blood pressure and may not even know they have it. Not treating high blood pressure is dangerous as it increases the risk of both heart attack and stroke. Make sure you get your blood pressure checked regularly and treat it the way your doctor advises.

Risks for high blood pressure can include:
- family history of high blood pressure
- people who are African American
- people who are overweight or obese
- people who smoke
- people with diabetes or kidney disease
Your doctor 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** – rid the body of excess sodium (salt) and water to help control blood pressure
- **beta blockers** – reduce the heart rate and the heart’s output of blood, which lowers blood pressure
- **vasodilators, ACE, ARB, calcium channel blockers** – relax and open up the narrowed blood vessels and lower blood pressure

### Atrial fibrillation

Atrial fibrillation is the most common cardiac disease associated with an increased risk of ischemic stroke. However, valvular heart disease, myocardial infarction (heart attack), coronary heart disease and congestive heart failure are also associated with an increased stroke risk.

Atrial fibrillation occurs when the atrial chambers of the heart shake or quiver instead of beating. This causes the atria to improperly relay electrical impulses to the ventricles causing them to beat slower and at an irregular rate. The ventricles may not be able to fill up with enough blood to supply the body with oxygen, which can cause you to feel weak or dizzy. Because the atria quiver instead of contract normally, blood may pool in the atria. This pooling may cause clots to form, which can make their way to your brain and cause a stroke.

Atrial fibrillation is usually seen in older patients with valve disease or hardening of the arteries. Thyroid disease, heart attack, enlargement of the heart, or heart failure may also cause this problem.

Some symptoms of atrial fibrillation are:

- irregular and rapid heart beat
- heart palpitations or thumping inside your chest
- dizziness, sweating, chest pain
- shortness of breath, anxiety
- fainting
- tiring more easily when exercising

Your doctor may order an electrocardiogram, or ECG, to determine if you have atrial fibrillation. The sooner you are treated, the better your chance of avoiding these problems.

Treatment options for A-fib include:

- **blood thinners** – helps to keep clots from forming
- **cardioversion** – an electric shock is given to the heart to help your heartbeat return to normal by interrupting the abnormal electric pattern
- **heart medication** – makes your heart beat slower and more regularly
Heart disease
Most strokes and heart attacks are due to atherosclerosis, which is a hardening of the artery from a buildup of plaque. Plaque is made up of fat, cholesterol, and calcium. It builds on the inside of the blood vessel and makes the artery narrow and hard. As the plaque builds up, it can slow and stop the blood to the brain. The best treatment for this is prevention, which can include eating healthy low fat foods, being physically active, not smoking, controlling your blood pressure and maintaining a healthy weight.

Diabetes
Diabetes is a condition in which the foods we eat cannot be properly used by the body for energy. Normally, food is broken down into sugar (glucose). Insulin, a hormone produced by the pancreas, takes the sugar from the bloodstream and transports it to body cells to use for energy. In a person who has diabetes, the pancreas is not producing enough insulin or 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. Monitoring your blood sugar, controlling your weight and cholesterol, being physically active, lowering your blood pressure and not smoking are all important steps to managing the disease and decreasing your risk for stroke.

Symptoms of diabetes can include:
• weakness
• frequent urination
• increased thirst
• hunger
• weight loss

High cholesterol
Cholesterol is a soft, fat-like substance found in the bloodstream and in all of your body’s cells. Too much cholesterol in the blood can lead to heart disease and stroke. Saturated fats, trans fats and cholesterol you eat may raise your blood cholesterol level.

Cholesterol and other fats can’t dissolve in your blood so they travel to your cells through carriers called lipoproteins. Low-density lipoprotein (LDL) cholesterol is often called “the bad kind” because you have too much LDL cholesterol in your blood, it can join with fats and other substances to build up in the inner walls of your arteries with plaque. The arteries can become clogged and narrow, and if this buildup of plaque ruptures, a blood clot may form at this location or a piece may break off and travel in the bloodstream. If a blood clot blocks the blood flow to your heart, it causes a heart attack. If a blood clot blocks an artery leading to or in the brain, a stroke results.
A “good kind” of cholesterol is called high-density lipoprotein (HDL), which carries harmful cholesterol away from the arteries and helps protect you from heart attack and stroke.

Lowering your cholesterol:
- Cut down on foods high in saturated fat and cholesterol like fatty meats, butter, cheese, whole-milk dairy products, egg yolks, shellfish, other fish, organ meats, poultry and solid fats (foods from animals).
- Do physical activities at least 30 minutes on most or all days of the week.
- Eat more foods low in saturated fat and cholesterol, and high in fiber like fruits and vegetables, whole grains and grain products, beans and peas, fat-free and low-fat milk products, lean meats and poultry without skin, fatty fish, and nuts and seeds.
- Maintain a healthy weight.

Some people may need to take medications as well, because changing their diet and exercise may not be enough. These medications, like Lipitor, are called statins and they help slow down production of certain enzymes that allow for production of cholesterol. It is also important to note that some people have a high cholesterol level due to genetic or hereditary reasons. Although the cause cannot be controlled, the management of high cholesterol can, with such medications.

**Carotid artery stenosis**

Carotid artery stenosis, also called carotid artery disease, is a narrowing of the main arteries supplying blood flow to the brain. Carotid artery stenosis occurs when there is a gradual buildup of plaque inside the blood vessel. Plaque forms when cholesterol, fat and other substances accumulate in the lining of the walls of the arteries. 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 take steps to prevent or delay the disease:
- unhealthy blood cholesterol levels
- high blood pressure
- smoking
- insulin resistance
- diabetes
- overweight or obesity
- metabolic syndrome
- lack of physical activity
- unhealthy diet
- older age
- family history of atherosclerosis
Your doctor may hear an abnormal sound over your carotid artery caused by disturbances in the blood flow when listening with a stethoscope. This is called a bruit (broo'-ie). The doctor 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, an angiography can also be performed to diagnose and show the degree of carotid artery stenosis.

If you have carotid artery disease, you can take steps to manage your condition. Treatment for carotid artery disease may include lifestyle changes, medicines, and medical/surgical procedures. Your treatment will depend on your symptoms, how severe the disease is, your age and overall health. You will need to work with your health care provider to develop a plan to address your specific risk factors.

**Medications**

Medication may be prescribed to help control your cholesterol and blood pressure. If it is unsuccessful, a surgical procedure may be recommended.

**Carotid endarterectomy**

This is an open surgical procedure commonly performed by a neurosurgeon or vascular surgeon. A small incision is made just below the jaw-line to expose the carotid artery at the site of the blockage. After placing a temporary shunt tube to redirect the blood flowing through the affected artery, the surgeon removes the plaque that is causing the carotid artery to be narrow or blocked.

**Carotid angioplasty/stenting**

A neuroradiologist uses diagnostic imaging to insert a special catheter through one of the main arteries in the groin, through your aorta (the major blood vessel of your heart) to the blockage in the carotid artery. The doctor then attempts to clear the blockage and open the artery up. This is an alternative to open surgery for patients who are elderly or who have other health issues like heart or lung disease, carotid disease on both sides, prior radiation therapy to the neck or prior carotid surgery.
Sickle Cell Disease

Sickle cell disease (SCD) is a red blood cell disorder that affects the protein, hemoglobin, in red blood cells that carries oxygen. Normal blood cells are round like doughnuts and flexible and they squeeze through small blood vessels to deliver oxygen to the body’s tissues. Sickle cells stick together to form long rods in the red cell, changing the red cell from round and flexible to a shape like a sickle. The sickled cells tend to stick to and damage the inner wall of blood vessels as well as clog the flow of the blood. Ischemic stroke is the second leading cause of death of those with sickle cell disease.

In the United States, sickle cell anemia affects about 72,000 people and is the most common inherited disease among African Americans. SCD occurs in one in every 600 African American births and one in every 1,000–1,400 Hispanic American births.

The best defense against a first or subsequent stroke in people (especially children) who have sickle cell is to effectively manage their disease. Even if you can’t completely prevent the first stroke, you can help reduce the risk of damage from another stroke.

Lifestyle for prevention of stroke

Lifestyle changes

A healthy lifestyle plays a big part in decreasing disability and death from stroke. Here are some ways that will help:

- Don’t smoke.
- Eat healthy foods.
- Be physically active.
- Get your blood pressure checked and control it if it is high.
- Reach and maintain a healthy weight.
- Decrease your stress level.

Managing stress

Managing your emotions may help in your quest to prevent stroke because some people respond to certain situations in ways that can cause health problems like excessive alcohol use, overeating or elevated blood pressure. Finding more satisfactory ways to respond to pressure will help protect your health.
Stress is your body’s response to change. It’s a very individual thing; a situation that one person finds stressful may not bother someone else. There is no way to identify what is considered stressful because everyone’s perception is different. The important thing is to manage stress properly.

Uncontrolled stress can also cause side effects like:

- making you feel angry, afraid, excited or helpless
- making it hard to sleep
- giving you aches in your head, neck, jaw and back
- leading to habits like smoking, drinking, overeating or drug abuse

**Quitting smoking**

**Health problems**

If you are a smoker, your risk of heart disease is doubled, significantly increasing your risk for a stroke. In addition to stroke, one out of every five deaths in the United States is related to smoking, as is one out of every three deaths from all cancers. Cigarette smoke contains over four thousand chemicals that will permeate throughout your body leading to a number of health conditions:

- lung cancer and smoker’s cough
- chronic obstructive pulmonary disease (COPD)
- heart disease
- ulcers
- emphysema
- loss of taste
- high blood pressure
- gum disease
- chronic sore throats and bronchitis

**Environmental problems**

Second hand smoke contains the same cancer causing material as the smoke you breathe in, a fact that accounts for non-smoking spouses of smokers as 24 percent more likely to develop lung cancer than those who live where nobody smokes. Studies also show that children of smoking parents are more likely to develop colds, childhood asthma, flu and ear infections than children of non-smokers.

When you quit smoking, you dramatically reduce your risk of death from lung cancer and heart disease and the sooner you quit, the longer your lungs will stay young. Smoking cigarettes tops the list as the most preventable major risk factor for heart and blood vessel disease, the number one contributor to stroke. However, no matter how much or how long you have been a smoker, when you quit, your risk immediately begins and continues to drop.

If you would like more information on how to quit smoking, please call 1-800-QUIT-NOW.
Good diet and maintaining a healthy weight

What we eat can make 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 and vegetables and 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) as salt allows you to hold onto fluid in your body making your heart work harder. It may be necessary for you to learn how to analyze food labels to recognize those with high sodium content.

More than 140 million 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 your heart, raises blood pressure and cholesterol and can lead to diabetes. 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 and can also be a very empowering activity. People who don’t get enough physical activity are much more likely to develop health problems. Regular, moderate-intensity physical activity can lower your risk of:

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

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

- pleasure/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
### Risk Score Card

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>High risk</th>
<th>Caution</th>
<th>Low risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure</td>
<td>&gt;140/90 or I don’t know</td>
<td>120-139/80-89</td>
<td>&lt;120/80</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>&gt;240 or I don’t know</td>
<td>200-239</td>
<td>&lt;200</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Yes</td>
<td>Borderline</td>
<td>No</td>
</tr>
<tr>
<td>Smoking</td>
<td>I still smoke</td>
<td>I’m trying to quit</td>
<td>I am a non-smoker</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>I have an irregular heartbeat</td>
<td>I don’t know</td>
<td>My heartbeat is not irregular</td>
</tr>
<tr>
<td>Diet</td>
<td>I am overweight</td>
<td>I am slightly overweight</td>
<td>My weight is healthy</td>
</tr>
<tr>
<td>Exercise</td>
<td>I am a couch potato</td>
<td>I exercise sometimes</td>
<td>I exercise regularly</td>
</tr>
<tr>
<td>Family history</td>
<td>I have stroke in my family</td>
<td>I don’t know</td>
<td>I don’t have stroke in my family</td>
</tr>
<tr>
<td>Score (each box = 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **If your red score is 3 or more, please ask your doctor about stroke prevention right away.**
- **If your yellow score is 4-6, you’re off to a good start. Keep working on it.**
- **If your green score is 6-8, congratulations! You’re doing very well at controlling your risk for stroke.**

For more information on your potential stroke risk, please call 1-800-STROKES or visit www.stroke.org

**Warning signs and symptoms of a stroke include:**

- Sudden numbness or weakness of 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

If you have any of these symptoms or see them in someone else, call 9-1-1 immediately. Treatment can be more effective if given quickly. Time is brain!
National Stroke Association’s 10 tips for a healthier and stroke-free you:

1. Know your blood pressure and if it is high, work with your doctor to lower it.
2. If you have atrial fibrillation or other heart disease, work with your doctor to manage it.
3. Quit smoking.
5. Know your cholesterol and if it is high, work with your doctor to lower it.
6. If you are diabetic, follow your doctor’s advice carefully to get your blood sugar level under control.
7. Include exercise in your daily routine.
8. Enjoy a lower sodium (salt), lower fat diet.
9. Know if you have circulation (blood flow) problems and if so, work with your doctor to control them.
10. If you have any stroke symptoms or see them in someone else, call 9-1-1.

The National Stroke Association provides education and services in stroke prevention, treatment, rehabilitation and recovery. They serve both the public and professional communities – people at risk for stroke, health care providers, public health officials, stroke survivors, their families and caregivers. Our public and professional education programs have provided millions of Americans with life-saving tools to prevent stroke, recognize stroke symptoms, educate people on where to get the best stroke care and provide information to stroke survivors so they can get more enjoyment from their lives.
Resources and notes
Resources

**Stroke Recovery and Support**

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

- **American Stroke Association**
  - 1-888-4-STROKE (1-888-478-7653)

- **National Stroke Association**
  - 1-800-STROKES (1-800-787-6537)
  - www.stroke.org

*Please call group’s contact information before attending any sessions to confirm dates and times as they are subject to change.*

<table>
<thead>
<tr>
<th>NAME</th>
<th>PURPOSE</th>
<th>LOCATION</th>
<th>FREQUENCY</th>
<th>TIME</th>
<th>INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cane and Able</td>
<td>Stroke recovery support group for individuals who have had a stroke, their families and friends.</td>
<td>Beaumont Medical Center, Sterling Heights Outpatient Services Center 44250 Dequindre Rd.</td>
<td>2nd and 4th Tuesday of the month</td>
<td>2 – 4 p.m.</td>
<td>248-964-0660</td>
</tr>
<tr>
<td>Stroke and Traumatic Brain Injury Caregiving</td>
<td>Support group provides support to caregivers of individuals who have had a stroke or brain injury.</td>
<td>Beaumont Health Center 4949 Coolidge Hwy. Royal Oak</td>
<td>Meets 4 times per year</td>
<td></td>
<td>248-655-5880</td>
</tr>
<tr>
<td>&quot;Friends&quot; Stroke Club</td>
<td>Group is for people recovering from stroke and operates under Beaumont's Speech &amp; Language Pathology. A variety of speakers are invited to bring stroke information to the group.</td>
<td>Congregation B'nai Moshe 6800 Drake Road West Bloomfield</td>
<td>1st and 3rd Friday of the month</td>
<td>11:30 a.m. – 2 p.m.</td>
<td>248-655-5976</td>
</tr>
<tr>
<td>Return to Work Stroke Support Group</td>
<td>Group provides support to individuals who have had a stroke or brain injury and are returning to the workforce.</td>
<td>Beaumont Health Center 4949 Coolidge Hwy. Royal Oak</td>
<td>2nd Wednesday of the month</td>
<td></td>
<td>248-655-5880</td>
</tr>
<tr>
<td>Royal Oak Aphasia Support Group</td>
<td>Support group for adults with communication disorders to gain support from others while on the road to recovery.</td>
<td>Royal Oak Senior Center 3500 Marias Royal Oak</td>
<td>Thursdays</td>
<td>10 a.m. – 12 p.m.</td>
<td>248-246-3917</td>
</tr>
<tr>
<td>Change of Pace Stroke Club</td>
<td>A weekly support group.</td>
<td>Warren Community Center 5460 Arden Warren</td>
<td>Wednesdays</td>
<td>10 a.m. – 12 p.m.</td>
<td>586-258-2069</td>
</tr>
</tbody>
</table>
Diabetes
American Diabetes Association
www.diabetes.org • 800-ADA-DISC

American Dietetic Association
www.eatright.org • 312-899-0040

National Diabetes Education Program
http://ndep.nih.gov

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

American Lung Association MI Connection
248.559.5100 • www.lungusa.org

American Heart Association
248.557.9500 • www.americanheart.org

Beaumont Hospital Support Groups
800-633-7377

Family support
If you need help taking care of yourself while caring for a loved one, ask for information at the doctor’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, call 1-888-4-STROKE (1-888-478-7653) or visit the Stroke Association online at www.strokeassociation.org

Please call group’s contact information before attending any sessions to confirm dates and times as they are subject to change.

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</tr>
</thead>
<tbody>
<tr>
<td>Caregiver’s Support Group</td>
<td>This group is facilitated by a licensed social worker and meets monthly for caregivers to gain knowledge and support related to their loved ones diagnosis.</td>
<td>Beaumont Health Center 4949 Coolidge Hwy. Royal Oak</td>
<td>1st Tuesday of the month</td>
<td>5 – 6 p.m.</td>
<td>248-655-5800</td>
</tr>
<tr>
<td>In Sickness and in Health</td>
<td>This support group is for caregivers and offers education and support for caregivers of an ill or disabled family member.</td>
<td>Beaumont Hospital, Royal Oak</td>
<td>1st Thursday of the month</td>
<td>3 – 5 p.m.</td>
<td>800-633-7377</td>
</tr>
</tbody>
</table>
Information about guardians and conservators:

Oakland County Probate Court ................................................................. 248-858-1000, opt. 4
Wayne County Probate Court ................................................................. 313-224-1890
Washtenaw County Probate Court ....................................................... 734-994-2474
Macomb County Probate Court ............................................................. 586-469-5290
Livingston County Probate Court ......................................................... 517-546-3750

Beaumont Helping Hands

A service that can assist in personal care and household services. Please call 248-551-0776 for additional information.

Sickle Cell Disease

Talk to your doctor. Learn all you can about managing your sickle cell disease and find out your risk for stroke. Share this information with everyone in your network to get help quickly in an emergency. For more information, contact the Sickle Cell Disease Association of America at 1-800-421-8423.
Glossary

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 doctors 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 ASA and 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.

ASA
ASA, which is short for acetylsalicylic acid, is commonly known as Aspirin®. It affects the body in a number of 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.

atherothrombosis (ath”er-o-throm-BO’sis)
Occurs when a blood clot forms on fatty deposits in the wall of a blood vessel. The blood clot is called a thrombus and the fatty deposit in the blood vessel is referred to as plaque (atheroma).

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 it is damaged by plaque deposits.

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.

brain hemorrhage
Bleeding in or on the brain.

bruit (BROO’e)
An unusual swishing sound when the blood flows through an artery. It is caused by turbulent or uneven blood flow.

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.

cerebrovascular occlusion
The blockage or closing of a blood vessel in 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
Short for 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.

eyesrhythmia
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
Short for 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.

emotional lability (LAH-bill-I-tee)
A term used to describe emotional responses that are exaggerated or inappropriate.
hemiplegia
Paralysis on one side of the body. It can also be called hemiparesis.

hemisphere
The brain is divided into two sides or hemispheres; the right and left.

hemorrhage
Bleeding from a burst blood vessel.

hemorrhagic stroke (HEM-or-RA-jik)
A stroke that happens when an artery wall bursts in or around the brain.

homocysteine (ho"mo-sis-TE'in)
A natural substance that is produced as the body breaks down protein for fuel. High levels in the blood have been linked to a higher risk of stroke. Folic acid can help to keep homocysteine levels in the blood low.

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.

incontinence (in-KAHN-tih-nens)
Trouble controlling your bowels or bladder.

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

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

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

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 particular 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, like smoking.

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

subarachnoid (sub'ah-RAK'noid) 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. It is also called a clot-buster.

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.
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