

Stroke—It can Strike Anyone at Anytime

Over 780,000 people will have a stroke this year. That's a lot of people. As a result, 160,000 of them will die and many others will suffer lifelong, devastating effects. You may think that only the elderly are vulnerable to stroke, but this is not true—it strikes all ages, races and genders. It is the third leading cause of death and the number one reason for adult disability. And, unfortunately, everyone has some level of risk for stroke. But here's the good news: you can reduce your risk and protect yourself from having a stroke. With the proper education and preventative measures, over 500,000 strokes can be prevented this year—that's a lot of people, too.

So What is a Stroke?

Stroke is a condition in which the brain does not receive proper oxygen or nutrients. It results when the blood supply to the brain is interrupted or reduced—by either a clot or bleeding. When the brain does not receive sufficient blood, it is deprived of oxygen and brain cells begin to die. Every minute the brain is without oxygen during a stroke, two million brain cells are lost. That's why stroke is sometimes referred to as “brain attack”, meaning that immediate care is essential—just like in a heart attack. The longer a person goes without medical attention during a stroke, the greater their risk of permanent brain damage, disability or death. There are two types of strokes, ischemic and hemorrhagic.

Ischemic stroke. This is the most common type of stroke, accounting for 85 percent of all strokes. Ischemic stroke occurs when arteries that supply blood to the brain become blocked or narrowed by a blood clot. There are two types of ischemic strokes:

Thrombotic stroke. In this type of stroke, a blood clot (thrombus) forms in a narrowed

At a Glance

- Stroke is the third leading cause of death and the number one reason for adult disability.
- Over 780,000 people die each year as a result of a stroke.
- Approximately 500,000 strokes could be prevented each year.
- Stroke can strike at any age, but people over 55 are at increased risk.
- There are many risk factors for stroke—most of them can be controlled through medication and lifestyle choices.
- Everyone has some degree of risk for having a stroke—you can know your risk.
- Immediate medical care is critical for someone who is having a stroke.
CALL 911
- With proper education and action, you can significantly reduce your risk of having a stroke.

artery that directly supplies blood to the brain. Often, the blood vessel where these clots form has been narrowed or damaged by fatty deposits—a condition called atherosclerosis. This can happen in any artery in the neck or brain; however, the carotid arteries in the neck are likely candidates.

Embolic stroke. In an embolic stroke, a blood clot forms in another part of the body (commonly the heart), travels to the brain and eventually reaches a vessel too narrow for it to pass. This type of stroke is often caused by poor blood flow related to atrial fibrillation (an irregular heartbeat).

Hemorrhagic stroke. A hemorrhagic stroke occurs when a weakened blood vessel bursts or bleeds. Some of the conditions which can cause hemorrhagic stroke include unmanaged high blood pressure, aneurysms, or arteriovenous malformations (AVM). Hemorrhagic stroke accounts for 15 percent of all strokes. Patients who suffer from a hemorrhagic stroke have a bleak prognosis—51 percent will die within one month. There are two types of hemorrhagic strokes:

Intracerebral hemorrhage. An intracerebral hemorrhage occurs when a blood vessel within the brain bursts, causing bleeding within the brain. High blood pressure is the most common cause of this type of stroke.

Subarachnoid hemorrhage. This type of stroke is caused by bleeding in an artery on or near the membrane surrounding the brain. It is usually caused by a ruptured aneurysm. When this occurs, the fluid surrounding the brain becomes contaminated, causing brain cell damage.

What are the Warning Signs?

For most people, stroke gives very little warning—it is typically painless, quick and silent. However, there are subtle warning signs that a stroke may be on the horizon; but you must pay attention to them and seek help—or it could be too late. All of these symptoms have sudden onset—they should not be brushed off or ignored; they need immediate evaluation. If you, or someone you know, have experienced one of the following symptoms, you should seek medical attention immediately.

Numbness. Numbness, weakness or paralysis on the face, arm or leg—especially on one side of the body.

Confusion. Impaired speech and understanding. Could include slurred speech, inability to come up with words or trouble following directions; unexplained state of confusion.

Loss of coordination. Trouble walking, dizziness, loss of balance or coordination.

Impaired vision. Quick onset of difficulty seeing in one or both eyes. Could include blurred, blackened or double vision.

Headache. Severe, persistent, unusual headache of unknown cause; could be accompanied by stiff neck, facial pain, vomiting or altered consciousness.

Stroke Requires F-A-S-T Action

- | | |
|------------|--|
| F (FACE) | Ask the person to smile.
Does one side droop? |
| A (ARMS) | Ask the person to raise both arms.
Does one arm drift downward? |
| S (SPEECH) | Ask the person to repeat a simple sentence.
Are the words slurred?
Can they repeat it correctly? |
| T (TIME) | Time is critical. If any of these symptoms are shown, do the following immediately: <ul style="list-style-type: none">• call 911• tell them stroke is suspected• ask for advanced life support |

Every minute lost means lost brain cells (and functionality). With quick attention, a clot-busting drug called tissue plasminogen activator (tPA) can reduce long-term disability for the most common type of stroke—but it must be given within three hours of the start of symptoms.

Another warning sign of an impending stroke is something called a transient ischemic attack or TIA. The symptoms of a TIA are the same as a stroke, but they are temporary. However, any time someone experiences stroke symptoms they should seek medical help immediately. A TIA could actually be a full-blown stroke—only time will tell. If it is a stroke, time cannot be wasted waiting. TIAs always need to be evaluated—ten to 20 percent of people who have TIAs will have a stroke within three months. Quick evaluation could prevent a stroke.

Am I at Risk?

Again, everyone has some level of stroke risk. If you are perfectly healthy and absolutely nothing is wrong with you, then your risk is low. But, there are many factors that increase your risk. Several of these are medical conditions which can be controlled—if you are aware of them. Therefore, it is of utmost importance to be proactive with your health and discuss risk factors with your doctor. Even “high

Know your Numbers—Know your Risk

If you want to understand your risk for stroke, you must understand and know your numbers. Even on the high normal end, you may be at increased risk—you should ask your doctor for additional tests. Do you know where you are?

Blood Pressure

	Systolic (first #)	And	Diastolic (second #)
Optimal	Below 120	And	Below 80
Prehypertension	120-139	Or	80-89
Hypertension 1	140-159	Or	90-99
Hypertension 2	160 and up	Or	100 and up

Cholesterol

Total (LDL and HDL)

Optimal	Less than 200
Borderline high	200-239
High	240 and up

LDL

Optimal	Less than 100
Near or above optimal	100-129
Borderline high	130-159
High	160-189
Very high	190 and up

HDL

Optimal	60 and up
Low	Less than 40 (men) Less than 50 (women)

Blood Glucose

	Fasting	2 hours after eating
Normal	Less than 100	Less than 140
Prediabetes	100-125	140-199
Diabetes	126 and up	200 and up

normal” ranges on the medical markers may put you at increased risk for stroke—especially if you are in the high normal range on more than one. Other risks include lifestyle choices that again, you have complete control over. And, there are a few factors

that you don’t have any control over—but you can educate yourself and assess your risk. Here are the most common risk factors:

High blood pressure. This is the number one cause of stroke. Unfortunately, high blood pressure, or hypertension, is completely silent and symptom-free—but once diagnosed, it can be successfully managed.

You need to know what your blood pressure is and where it falls in the range. It should be checked at least once a year. If you have high blood pressure, you should take your medication religiously. If you have borderline high blood pressure (or have prehypertension), take precautions to reduce it. *Diabetes.* People with diabetes are also at increased risk of having a stroke. If you are diabetic, you should manage your blood sugar levels vigilantly, follow your doctor’s instructions for diet and exercise, and make sure you have regular checkups. If you are prediabetic, take precautions.

High cholesterol. A total cholesterol (combined HDL and LDL) of over 200 puts you at risk for stroke. If you have high cholesterol (or are nearing the high range) talk to your doctor about using a statin drug like Crestor or Lipitor. These medications can reduce your cholesterol.

Abnormal heart beat. An abnormal heartbeat, or atrial fibrillation, causes blood to pool in the heart increasing the likelihood that clots will form. A doctor can detect atrial fibrillation by simply checking your pulse.

Partial blockages or narrowing of arteries. Atherosclerosis (or plaque buildup) in the arteries increases your risk for stroke. Screening ultrasounds are commonly used to detect atherosclerosis—this may or may not be covered by insurance.

Smoking. Cigarette smoking has been proven to damage the cardiovascular system, increasing your risk for stroke—and lots of other things. If you smoke, stop. After five years cigarette-free, your risk will be the same as a non-smoker.

Oral contraceptives. Recent studies have confirmed that women between the ages of 35-45 who use oral contraceptive and also have migraine headaches are at an increased risk for having a stroke. In addition, oral contraceptives combined with cigarette smoking increases your risk substantially.

Age. People over the age of 55 are at an increased risk for having a stroke. Preventive screenings can help assess this risk.

Gender. Men are more likely than women to experience a stroke; however, women are more likely to die from stroke (possibly because women live longer).

Family history. If you have a first degree relative who has had a stroke, you are at an increased risk.

Previous stroke or TIA. If you have had a stroke or a TIA, you are at increased risk of having another stroke and should be monitored carefully by your physician. One third of people who have a second stroke will become demented within a year of the second stroke.

When you consider your risk factors for stroke, you need to look at the whole picture. Even though you may not have high-blood pressure, if you are on the high-normal range, and you are overweight, your risk is elevated. A borderline reading on any of the medical makers may be reason for closer investigation—especially if you have any other risk factors. Any combination of risk factors is a red flag. The National Stroke Association offers an on-line risk evaluation tool at http://www.stroke.org/site/DocServer/scorecard_risk.pdf?docID=601. Talk to your doctor about your risk.

How Can I Prevent It?

The good news is you can prevent a stroke. Yes, the third most common killer is completely preventable. But, prevention is in your hands. You must take charge of your health and evaluate your risk factors. Part of taking charge of your health is making good lifestyle choices like exercising, eating right and avoiding drugs and alcohol. But, another part is being proactive with your healthcare. This starts with a good relationship with your doctor—but it does not end there. You should never rely solely on your doctor to determine and manage your health. If you do the following, you can reduce your risk for stroke by over 50 percent:

Manage your risk factors. If you have determined that you have one or more of the risk factors for stroke, then take it seriously and keep it controlled. Make sure you take your medications exactly as directed and have regular checkups.

Know your numbers. Educate yourself on your risk factors like blood sugar, blood pressure and cholesterol. Know where your numbers are in the range of

normal, high normal, or high. If you are borderline, talk to your doctor about how to lower the numbers before they move into the high range. (see inset “Know Your Risk—Know Your Numbers”)

Get more tests if needed. If your medical markers are in the high normal range there are simple blood tests, like measuring hs-CRP, that can better assess your risk. Also, if you have been told that you are pre-diabetic or pre-hypertension, you should seek additional testing. Artery screenings are also very useful tools in risk evaluation—especially if there is a family history of stroke.

Take control of your health. Tell your doctor that you want to be as healthy as possible and prevent any potential problems. Make sure your doctor is providing thorough and comprehensive care and listening to you.

Eat a healthy diet. Eat a well-balanced, low-fat diet, rich in fiber and nutrients and low in salt.

Maintain your weight. Obesity can lead to the development of many risk factors. Your optimal BMI should be below 30.

Exercise regularly. 30 minutes of daily exercise can help you avoid many stroke risk factors. It can help control weight, reduce your cholesterol, blood pressure and blood sugar. And, it can help manage stress.

Limit alcohol consumption. Heavy alcohol use increases your risk of high blood pressure and ischemic stroke—even moderate alcohol consumption can increase your HDL cholesterol, putting you at increased risk of stroke.

How is it Diagnosed?

After someone has exhibited symptoms of a stroke, careful and immediate examination by a qualified physician is required. The patient or their family members must call 911 immediately and the patient should be taken to the closest qualified stroke center. The stroke center physician will collect information and most likely perform a series of diagnostic tests. From these tests, your doctor will be able to determine the source or cause of the stroke and recommend proper treatment. Following is an overview of what you might expect when being evaluated for a stroke:

Medical history. Your doctor should obtain a thorough medical history from you, including family

history, details about symptoms, and any other medical conditions.

Physical exam. A complete physical exam should be conducted including vision, blood pressure, and a neurological exam.

Lab work. An extensive blood panel should be drawn to evaluate risk factors (blood sugar, cholesterol, etc.)

Diagnostic tests. One or more of the following tests may be conducted, depending on the suspected cause of the stroke (many of these are also used for screening). Most of these are quick, painless and risk-free.

Computerized tomography (CT). This is an imaging test that uses radiation to reveal any problems with the blood vessels in your brain or neck. This test is required prior to treatment with clot-busting medications.

Magnetic resonance imaging (MRI). MRI uses strong, magnetic fields to produce images of the brain. MRI provides a more detailed picture than CT and is therefore used to detect smaller or deeper injuries. Sometimes an injected dye is used in combination with MRI for closer examination of the arteries and veins. This is called magnetic resonance angiography (MRA).

Ultrasound. In this test, a wand-like device is placed over the suspected artery. Sound waves are bounced through the tissue and any narrowing is revealed. The ultrasound can be obtained of the neck vessels (carotid ultrasound) or the brain vessels (transcranial Doppler ultrasound).

Echocardiography. This test utilizes ultrasound technology to view the heart. For very close, detailed imaging of the heart, transesophageal echocardiography (TEE) may be used. In TEE, a small ultrasound probe is actually swallowed and the heart can be viewed internally via the esophagus.

Arteriography. In this test, a thin, flexible tube is inserted through an incision (typically in the groin). A dye is injected and the tube is guided through the arteries, revealing any narrowing or blockages.

Who Treats a Stroke?

The best approach to treating a stroke is with a qualified, skilled and specialized team of physicians. Stroke can be caused by many different variables, and in order to get complete and accurate diagnosis

— and effective treatment—it is critical to have a group of specialized physicians working together. The best place to start for prevention of a stroke is with a trusted, qualified primary care physician. But, when risk factors are recognized, or symptoms are experienced, you should make sure you have the right team of trained specialists in place—and that they talk to each other. If you think you have had a stroke, seek treatment at a reputable, comprehensive stroke care facility to ensure the best care, treatment and prognosis. Some of the specialists you may need include: stroke neurologist, neuroradiologist, neurosurgeon, cardiologist, vascular specialist, internists, physical therapists, nutritionists, and rehabilitation doctors,. At Baylor College of Medicine, you can rest assured that we have the right team in place, ready to take care of you in the event of a stroke.

How is it Treated?

The best way to treat a stroke is to prevent it. This means knowing your risk factors and managing them diligently. If you have had a stroke, it is even more important to manage your risk factors—one third of the people who have a secondary stroke will die as a result. There are many forms of stroke treatment, depending on the type and cause of the stroke. Here is an overview:

Ischemic stroke treatment.

Medication. A clot-busting drug called tissue plasminogen activator (tPA) can be very effective, if administered within the first three hours of symptoms. Unfortunately, less than five percent of stroke victims reach the hospital in time for this option. Often anticoagulant drugs (or blood thinners) like warfarin or antiplatelet medications such as aspirin are used after a stroke to prevent the formation of blood clot(s).

Surgery or endovascular treatment. Blockages can be removed surgically by endarterectomy or endovascularly via angioplasty and stenting, by a skilled surgeon or endovascular physician. In addition, surgery may sometimes be required to relieve pressure or swelling in the brain.

Hemorrhagic stroke treatment.

Surgery. Surgery is usually the recommended treatment for hemorrhagic stroke. Sometimes, major surgery is required to clip an aneurysm or remove an AVM. However, many endovascular procedures are becoming available that help

patients avoid the risks and recovery of traditional surgery. With this option, a skilled endovascular physician inserts a catheter through a major artery in the arm or leg. It is then guided to the site of the aneurysm, where a tiny coil is inserted to seal the aneurysm off and stop bleeding.

Life after a Stroke

Stroke can be life-altering—not just for the patient, but for their family and caregivers as well. Depending on the severity of the stroke, and the area of the brain affected, mobility and functionality may be limited. Because of these limitations, skills that were once simple and rote become foreign and impossible—and rehabilitation is required. With proper rehabilitation and support, ten percent of stroke patients can regain full functionality. However, 50 percent will experience moderate to severe impairment and require special care—permanently. Stroke victims can maximize their recovery potential by doing the following:

- Receive care at a qualified, comprehensive stroke care facility
- Begin physical therapy as soon as possible in the hospital (research shows that you are more likely to follow medical directions if you receive them while you are sick)
- Make sure you have a highly-skilled rehabilitation team including a rehabilitation doctor, nurse, dietitian, physical therapist, occupational therapist, recreational therapist, speech therapist, social worker, psychologist or psychiatrist
- Monitor risk factors diligently to prevent subsequent stroke
- Have caring, supportive family and friends
- Keep a positive, motivated attitude

What is Baylor College of Medicine Doing about It?

A lot. At Baylor College of Medicine we are working hard to prevent, treat and eliminate stroke. We see the effect it has on people and their families—and it is devastating. Our goal is to provide our patients with everything they need to prevent, treat and recover from a stroke. Here's an overview:

Prevention. At BCM, we have an excellent stroke evaluation program that is consistently ranked among the top ten in the country. Through this program, our primary care physicians work in a

collaborative environment with world-class specialists to thoroughly evaluate your risk for stroke. If you are borderline on any risk factors, one of our specialists will further evaluate you and recommend preventive treatment—all in one convenient location.

Team treatment. If you come into Baylor with stroke symptoms, a team of qualified physicians will be ready to receive you. With a written protocol for stroke treatment, our team works together efficiently and effectively to provide you with the most immediate, comprehensive, and high-quality care available — because that's what you deserve. This team is comprised of stroke neurologists, neuroradiologists, neurosurgeons, rehabilitation specialists, therapists (occupational, physical, speech), dietitians, nurses and social workers. From the time you enter the hospital, go to rehab, go home and then come back to the clinic—we will be with you to make sure you have everything you need.

Rehabilitation facility. Our state-of-the-art rehabilitation facility gives you the best opportunity for maximum recovery. And it's right under our roof.

Research. At BCM, much research is underway on how to better prevent and treat stroke. Currently, we are participating in a study to reduce the risk of stroke in people with an LDL under 130 by using statin drugs. In addition, we have recently discovered the presence of certain proteins in the blood can be an indicator of inflammation, pointing to an increased stroke risk. This means a simple blood test to measure these proteins can more precisely assess stroke risk in borderline patients. We are also looking into new medications, therapies, imaging techniques and genetic predispositions that may help identify stroke risk, prevent stroke and protect the brain after stroke. We are currently studying the administration of human albumin to protect the brain and improve patients' lives after both ischemic and hemorrhagic strokes. We are also studying newer stents for narrowing of brain blood vessels to prevent strokes. Our clinician scientists are well funded by the National Institutes of Health to carry out their research.

We Will Take Care of You

Hopefully, you will never have a stroke. But, if you do—or if you want to make sure you don't—Baylor Clinic is ready to give you the care you deserve. We have a team of qualified professionals standing by to provide you with high-quality,

personalized medical care. We can help you prevent a stroke, or we can ensure you the best possible care, treatment and outcome if you have had a stroke. At Baylor Clinic it is all about you. We provide the highly-skilled resources you need to manage your health. Our doctors will listen to you and work collaboratively to treat you. With our integrated approach, we combine the best of medicine, science, education and service to deliver comprehensive, compassionate care. At Baylor Clinic, you will have access to all the experts you need and the benefits of the latest technology, discoveries and advances in medicine. What we are learning in our research today is implemented tomorrow. It all comes back to you. Let our doctors take care of you.

Call Us Today—We're Waiting for You

The physicians of Baylor Clinic are some of the best minds in medicine. We offer personalized care for the whole person and the whole family, meeting the needs of all ages and addressing all types of health-care concerns. Our patients benefit from:

- Board-certified physicians and certified physician's assistants
- Onsite specialists, when needed, expediting your treatment
- Innovative treatments based on the latest research findings
- Modern systems that make the healthcare process easier
- A collaborative environment that brings together multiple specialists all working together to improve your care and treatment

Make an appointment with a Baylor Clinic expert physician today.

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