

Patient Handouts



Stroke

What is a stroke?

A stroke or "brain attack" occurs when a blood clot blocks an artery (a blood vessel that carries blood from the heart to the body) or a blood vessel (a tube through which the blood moves through the body) breaks, interrupting blood flow to an area of the brain. When either of these things happen, brain cells begin to die and brain damage occurs.

When brain cells die during a stroke, abilities controlled by that area of the brain are lost. These abilities include speech, movement and memory. How a stroke patient is affected depends on where the stroke occurs in the brain and how much the brain is damaged.

For example, someone who has a small stroke may experience only minor problems such as weakness of an arm or leg. People who have larger strokes may be paralyzed on one side or lose their ability to speak. Some people recover completely from strokes, but more than 2/3 of survivors will have some type of disability.

Stroke symptoms 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 experienced any of these symptoms, you may have had a TIA or mini-stroke.

If you think someone may be having a stroke, act F.A.S.T. to remember the warning signs:

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 the speech slurred or strange?
Time	If you observe any of these signs, call 911 immediately.

NOTE THE TIME WHEN ANY SYMPTOMS FIRST APPEAR. If given within three hours of the first symptom, there is an FDA-approved clot-buster medication that may reduce long-term disability for the most common type of stroke. There are also two other types of stroke treatment available that might help reduce the effects of stroke

Types of stroke

There are two main ways "brain attacks" can happen: ischemic and hemorrhagic strokes. In ischemic strokes, a blood clot blocks or "plugs" a blood vessel in the brain. In hemorrhagic strokes, a blood vessel in the brain breaks or ruptures.

Ischemic stroke: In everyday life, blood clotting is beneficial. When you are bleeding from a wound, blood clots work to slow and eventually stop the bleeding. In the case of stroke, however, blood clots are dangerous because they can block arteries and cut off blood flow, a process called ischemia. An ischemic stroke can occur in two ways: embolic and thrombotic strokes.

Embolic stroke: In an embolic stroke, a blood clot forms somewhere in the body (usually the heart) and travels through the bloodstream to your brain. Once in your brain, the clot eventually travels to a blood vessel small enough to block its passage. The clot lodges there, blocking the blood vessel and causing a stroke. The medical word for this type of blood clot is embolus.

Thrombotic stroke: In the second type of blood-clot stroke, blood flow is impaired because of a blockage to one or more of the arteries supplying blood to the brain. The process leading to this blockage is known as thrombosis. Strokes caused in this way are called thrombotic strokes. That's because the medical word for a clot that forms on a blood-vessel deposit is thrombus.

Blood-clot strokes can also happen as the result of unhealthy blood vessels clogged with a buildup of fatty deposits and cholesterol. Your body regards these buildups as multiple, tiny and repeated injuries to the blood vessel wall. So your body reacts to these injuries just as it would if you were bleeding from a wound; it responds by forming clots. Two types of thrombosis can cause stroke large vessel thrombosis and small vessel disease (or lacunar infarction).

Large vessel thrombosis: Thrombotic stroke occurs most often in the large arteries, so large vessel thrombosis is the most common and best understood type of thrombotic stroke. Most large vessel thrombosis is caused by a combination of long-term atherosclerosis followed by rapid blood clot formation. Thrombotic stroke patients are also likely to have coronary artery disease, and heart attack is a frequent cause of death in patients who have suffered this type of brain attack.

Small vessel disease/Lacunar infarction: Small vessel disease, or lacunar infarction, occurs when blood flow is blocked to a very small arterial vessel. The term's origin is from the Latin word lacuna which means hole, and describes the small cavity remaining after the products of deep infarct have been removed by other cells in the body. Little is known about the causes of small vessel disease, but it is closely linked to hypertension (high blood pressure).

Hemorrhagic stroke: Strokes caused by the breakage or "blowout" of a blood vessel in the brain are called hemorrhagic strokes. The medical word for this type of breakage is hemorrhage. Hemorrhages can be caused by a number of disorders which affect the blood vessels, including long-standing high blood pressure and cerebral aneurysms. An *aneurysm* is a weak or thin spot on a blood vessel wall. These weak spots are usually present at birth. Aneurysms develop over a number of years and usually don't cause detectable problems until they break. There are two types of hemorrhagic stroke:

subarachnoid and intracerebral.

In an *intracerebral hemorrhage*, bleeding occurs from vessels within the brain itself. Hypertension is the primary cause of this type of hemorrhage.

In a *subarachnoid hemorrhage* (SAH), an aneurysm bursts in a large artery on or near the thin, delicate membrane surrounding the brain. Blood spills into the area around the brain which is filled with a protective fluid, causing the brain to be surrounded by blood-contaminated fluid.

The FDA recently issued a voluntary recall of non-prescription medications containing PPA (phenylpropanolamine) after they were linked to an increased risk of hemorrhagic stroke in women.

Stroke myth

Myth	Reality
Stroke is unpreventable	Stroke is largely preventable
Stroke cannot be treated	Stroke requires emergency treatment
Stroke only strikes the elderly	Stroke can happen to anyone
Stroke happens to the heart	Stroke is a "Brain Attack"
Stroke recovery only happens for a few months following a stroke	Stroke recovery continues throughout life

Am I at risk for a stroke?

Anyone can have a stroke no matter your age, race or gender. But, the chances of having a stroke increase if a person has certain risk factors, or criteria that can cause a stroke. The good news is that up to 80 percent of strokes can be prevented, and the best way to protect yourself and loved ones from stroke is to understand personal risk and how to manage it.

There are 2 types of risk factors for stroke: controllable and uncontrollable. Controllable risk factors generally fall into two categories: lifestyle risk factors or medical risk factors. Lifestyle risk factors can often be changed, while medical risk factors can usually be treated. Both types can be managed best by working with a doctor, who can prescribe medications and advise on how to adopt a healthy lifestyle. Uncontrollable risk factors include being over age 55, being male, being African American, Hispanic or Asian/Pacific Islander, or having a family history of stroke or transient ischemic attack (TIA).

Controllable risk factors:

- High Blood Pressure
- Atrial Fibrillation
- High Cholesterol
- Diabetes

- Atherosclerosis
- Tobacco Use and Smoking
- Alcohol Use
- Physical inactivity
- Obesity

Uncontrollable risk factors:

- Age
- Gender
- Race
- Family History
- Previous Stroke or TIA
- Fibromuscular Dysplasia
- Patent Foramen Ovale (PFO or Hole in the Heart)

Use our [Stroke Risk Scorecard](#) to get an idea of your personal stroke risk.

Controllable stroke risk factors

Stroke risk can be controlled easier than one might think. With the help of a doctor, many diseases that increase risk can be treated, while lifestyle risk factors such as unhealthy eating and smoking can be changed.

Treatable diseases that increase stroke risk:

High blood pressure (hypertension): High blood pressure is a major risk factor for stroke. Blood pressure by definition is the force of blood pushing against the walls of your arteries. High blood pressure causes the heart to pump harder to move blood through the body. This can weaken blood vessels and damage major organs such as the brain. Left untreated, high blood pressure can lead to stroke.

Atrial fibrillation (AF): Atrial Fibrillation (AF) is caused when the two upper chambers of the heart (atria) beat rapidly and unpredictably, producing an irregular heartbeat. AF raises stroke risk because it allows blood to pool in the heart. When blood pools, it tends to form clots which can then be carried to the brain, causing a stroke. Long-term untreated AF can also weaken the heart, leading to heart failure.

High cholesterol: Cholesterol is a fatty substance in the blood that the human body makes on its own, but it also comes from fat in foods. High levels of cholesterol in the bloodstream can clog arteries and cause a stroke or heart attack.

Diabetes: In people with diabetes, the body either doesn't produce enough insulin or the cells ignore the insulin. Without insulin, the body can't process sugar, which is the basic fuel for the cells in the body. People with diabetes are up to 4 times more likely to have a stroke than someone who does not have the disease, mainly because many people with diabetes have health problems that are also stroke risk factors.

Atherosclerosis: Atherosclerosis is the progressive buildup of plaque – fatty deposits and other cells – in artery walls. It can clog arteries and block the flow of blood to the brain or other parts of the body, making a person more at risk for a stroke, TIA or other heart disease.

Lifestyle choices that increase stroke risk

Tobacco use/smoking: Among other things, smoking damages blood vessel walls, speeds up the

clogging of arteries, raises blood pressure and makes the heart work harder. Smoking also doubles the risk of stroke.

Alcohol use: Alcohol use has been linked to stroke in many studies. For example, drinking large amounts of alcohol may increase risk for stroke.

Obesity: Obesity and excess weight put a strain on the entire circulatory system. Obesity also makes people more likely to have high cholesterol, high blood pressure and diabetes -- all of which can increase risk for stroke. Adopting healthy eating habits and increasing physical activity can help reduce stroke risk.

Uncontrollable stroke risk factors

Age: A stroke can happen to anyone, but risk of stroke increases with age. After the age of 55, stroke risk doubles for every decade a person is alive.

Gender: Women suffer more strokes each year than men, mainly because women live longer than men and stroke occurs more often at older ages. Annually, about 55,000 more women than men have strokes, but stroke incidence is higher in men than women at younger ages. Additionally, women are two times more likely to die of a stroke than breast cancer annually.

A 2006 study of women ages 45 and older showed significantly reduced risk for ischemic stroke (stroke caused by a clot) when women maintained a healthy lifestyle that includes no smoking, moderate alcohol use, average weight for their height, regular exercise and a healthy diet.

Race: African Americans have twice the risk of stroke when compared to Caucasians. Hispanic and Asian/Pacific Islanders also have higher risk than Caucasians.

Family history: If a family member has had a stroke, everyone in the family has a higher risk of stroke.

Previous stroke or TIA: After experiencing a stroke, survivors and their families usually concentrate their efforts on rehabilitation and recovery. However, preventing a "recurrent" stroke from happening is also a critical consideration. About 5 to 14 percent of the people who have a stroke this year will have a second one. Within the next 5 years, stroke will recur in 24 percent of women and 42 percent of men.

Stroke prevention is also important to those who have experienced transient ischemic attacks (TIAs). TIAs are brief episodes of stroke-like symptoms that can last from a few minutes to 24 hours, but usually cause no permanent damage or disability. TIAs are serious warning signs of an impending stroke. Up to 40 percent of people who experience a TIA are expected to have a stroke. However, many recurrent strokes and TIAs can be prevented through lifestyle changes, surgery, medication or a combination of all three methods.

Fibromuscular dysplasia (FMD): FMD is a medical disorder where some of the arteries that carry blood throughout the body do not develop as they should. Fibrous tissue grows in the wall of the arteries, causing them to narrow. As a result, blood flow through the arteries decreases.

Hole in the heart: patent foramen ovale (PFO): Strokes and TIAs can occur without any obvious risk factors because they are caused by a "hole" in the heart called a patent foramen ovale (PFO). About 1 in 5 Americans has a PFO. Many don't know it until a medical condition like a stroke or TIA occurs. PFOs often have no symptoms but they may increase your risk for stroke and TIA. Many PFO-related strokes are called cryptogenic, meaning they have no apparent cause.

Stroke prevention guidelines

The Stroke Prevention Guidelines were established by National Stroke Association's Stroke Prevention Advisory Board, an elite group of the nation's leading experts on stroke prevention. They were first published in a 1999 issue of Journal of the American Medical Association (JAMA) and have been updated to reflect current medical standards.

National Stroke Association suggests you ask your doctor for advice on how to best use these guidelines.

Know your blood pressure

High blood pressure is a major stroke risk factor if left untreated. Have blood pressure checked yearly by a doctor or at health fairs, a local pharmacy or supermarket or with an automatic blood pressure machine.

Find out if you have atrial fibrillation

Afib is an abnormal heartbeat that can increase stroke risk by 500%. Afib can cause blood to pool in the heart and may form a clot and cause a stroke. A doctor must diagnose and treat Afib.

Stop smoking

Smoking doubles the risk of stroke. It damages blood vessel walls, speeds up artery clogging, raises blood pressure and makes the heart work harder.

Control alcohol use

Alcohol use has been linked to stroke in many studies. Most doctors recommend not drinking or drinking only in moderation - no more than two drinks each day.

Know cholesterol levels

Cholesterol is a fatty substance in blood that is made by the body. It also comes in food. High cholesterol levels can clog arteries and cause a stroke. See a doctor if your total cholesterol level is more than 200.

Control diabetes

Many people with diabetes have health problems that are also stroke risk factors. A doctor and dietician can help manage diabetes.

Manage exercise/diet

Excess weight strains the circulatory system. Exercise five times a week. Maintain a diet low in calories, salt, saturated and trans fats and cholesterol. Eat five servings of fruits and vegetables daily.

Treat circulation problems

Fatty deposits can block arteries carrying blood to the brain and lead to a stroke. Other problems such as sickle cell disease or severe anemia should be treated.

Transient ischemic attack

A TIA is a temporary episode of stroke-like symptoms that can last a few minutes to 24 hours but usually causes no permanent damage or disability. TIA and stroke symptoms are the same. Recognizing and treating a TIA can reduce stroke risk. Up to 40 percent of people who experience a TIA may have a stroke.

Effects of stroke

The ability to define the world and our place in it distinguishes our humanity. Stroke or brain attack forever alters this world-making capacity. The stroke patient's world, once comprehensible and manageable, is transformed into a confusing, intimidating and hostile environment. The skills of intellect, sensation, perception and movement, which are honed over the course of a lifetime and which so characterize our humanity are the very abilities most compromised by stroke. Stroke can rob people of the most basic methods of interacting with the world.

The specific abilities that will be lost or affected by stroke depend on the extent of the brain damage and most importantly where in the brain the stroke occurred. The brain is an incredibly complex organ, and each area within the brain has responsibility for a particular function or ability. The brain is divided into four primary parts: the right hemisphere (or half), the left hemisphere, the cerebellum and the brain stem.

Right-hemisphere stroke: The right hemisphere of the brain controls the movement of the left side of the body. It also controls analytical and perceptual tasks, such as judging distance, size, speed, or position and seeing how parts are connected to wholes.

A stroke in the right hemisphere often causes paralysis in the left side of the body. This is known as left hemiplegia. Survivors of right-hemisphere strokes may also have problems with their spatial and perceptual abilities. This may cause them to misjudge distances (leading to a fall) or be unable to guide their hands to pick up an object, button a shirt or tie their shoes. They may even be unable to tell right-side up from upside-down when trying to read.

Along with their impaired ability to judge spatial relationships, survivors of right-hemisphere strokes often have judgment difficulties that show up in their behavioral styles. These patients often develop an impulsive style unaware of their impairments and certain of their ability to perform the same tasks as before the stroke. This behavioral style can be extremely dangerous. It may lead the left hemiplegic stroke survivor to try to walk without aid. Or it may lead the survivor with spatial and perceptual impairments to try to drive a car.

Survivors of right-hemisphere strokes may also experience left-sided neglect. Stemming from visual field impairments, left-sided neglect causes the survivor of a right-hemisphere stroke to "forget" or "ignore" objects or people on their left side.

Finally, some survivors of right-hemisphere strokes will experience problems with short-term memory. Although they may be able to recount a visit to the seashore that took place 30 years ago, they may be unable to remember what they ate for breakfast that morning.

Left-hemisphere stroke: The left hemisphere of the brain controls the movement of the right side of the body. It also controls speech and language abilities for most people. A left-hemisphere stroke often causes paralysis of the right side of the body. This is known as right hemiplegia.

Someone who has had a left-hemisphere stroke may also develop aphasia. Aphasia is a catch-all term used to describe a wide range of speech and language problems. These problems can be highly specific, affecting only one component of the patient's ability to communicate, such as the ability to move their speech-related muscles to talk properly. The same patient may be completely unimpaired when it comes to writing, reading or understanding speech.

In contrast to survivors of right-hemisphere stroke, patients who have had a left-hemisphere stroke often develop a slow and cautious behavioral style. They may need frequent instruction and feedback to

complete tasks.

Finally, patients with left-hemisphere stroke may develop memory problems similar to those of right-hemisphere stroke survivors. These problems can include shortened retention spans, difficulty in learning new information and problems in conceptualizing and generalizing.

Cerebellar stroke: The cerebellum controls many of our reflexes and much of our balance and coordination. A stroke that takes place in the cerebellum can cause abnormal reflexes of the head and torso, coordination and balance problems, dizziness, nausea and vomiting.

Brain stem stroke: Strokes that occur in the brain stem are especially devastating. The brain stem is the area of the brain that controls all of our involuntary, "life-support" functions, such as breathing rate, blood pressure and heartbeat. The brain stem also controls abilities such as eye movements, hearing, speech and swallowing. Since impulses generated in the brain's hemispheres must travel through the brain stem on their way to the arms and legs, patients with a brain stem stroke may also develop paralysis in one or both sides of the body.

Recovery & rehabilitation

Current statistics indicate that there are over 4 million people in the United States who have survived a stroke or brain attack and are living with the after-effects. These numbers do not reflect the scope of the problem and do not count the millions of husbands, wives and children who live with and care for stroke survivors and who are, because of their own altered lifestyle, greatly affected by stroke.

The very word "stroke" indicates that no one is ever prepared for this sudden, often catastrophic event. Stroke survivors and their families can find workable solutions to most difficult situations by approaching every problem with patience, ingenuity, perseverance and creativity.

Early recovery: There's still so much we don't know about how the brain compensates for the damage caused by stroke or brain attack. Some brain cells may be only temporarily damaged, not killed, and may resume functioning. In some cases, the brain can reorganize its own functioning. Sometimes, a region of the brain "takes over" for a region damaged by the stroke. Stroke survivors sometimes experience remarkable and unanticipated recoveries that can't be explained. General recovery guidelines show:

- 10 percent of stroke survivors recover almost completely
- 25 percent recover with minor impairments
- 40 percent experience moderate to severe impairments requiring special care
- 10 percent require care in a nursing home or other long-term care facility
- 15 percent die shortly after the stroke

Rehabilitation: Rehabilitation actually starts in the hospital as soon as possible after the stroke. In patients who are stable, rehabilitation may begin within two days after the stroke has occurred, and should be continued as necessary after release from the hospital.

Depending on the severity of the stroke, rehabilitation options include:

- A rehabilitation unit in the hospital
- A subacute care unit
- A rehabilitation hospital
- Home therapy
- Home with outpatient therapy

- A long-term care facility that provides therapy and skilled nursing care

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Ask your doctor what to expect from your particular stroke rehabilitation program.

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