Health Facts for You

Ischemic stroke

UWHealth

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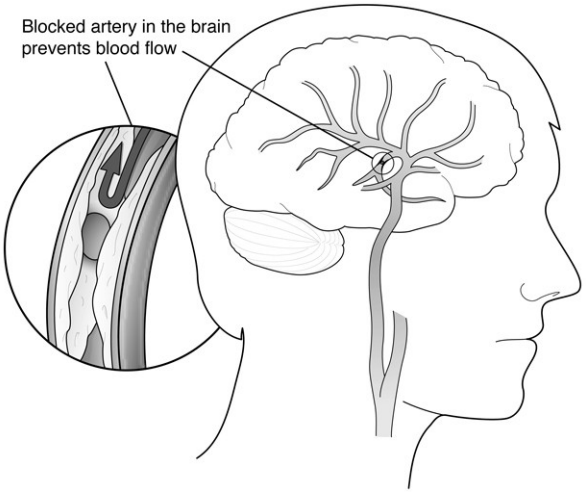
An ischemic (ih-SKEE-mik) stroke is when blood vessels to the brain become narrow or clogged. This cuts off blood to part of the brain. When too little blood gets to the brain, the cells die. Fast treatment is needed to decrease brain damage and problems. 80% of strokes are ischemic strokes.



If you or your loved one has had a stroke, it can be a stressful time filled with questions and concerns. We will explain every step of your care and answer your questions. The stroke team will help you on the path to recovery. We will provide support in your transition of care out of the hospital.

Our team of doctors, nurses, therapists, pharmacists, case managers and social workers are here to help you. Be sure to ask questions and be involved in your care.

Effects of a Stroke
The effects of a stroke vary for each stroke survivor. Each person heals in a different way. Recovery occurs over days, weeks and months after a stroke. Changes caused by a stroke can be physical, cognitive and emotional.

Physical Changes
Muscles in the arms, legs and face can be affected by a stroke. This can change the way a person walks, talks or swallows. A stroke can also increase muscle tone, making muscles tight and hard to move.

Cognitive Changes
A stroke may change how someone thinks, talks, and understands others. Problem solving, attention and memory may also be affected.

Emotional Changes
A stroke can change emotions and behaviors. A person might be more tired, irritated, restless or confused. Feelings of anger, fear or depression are also common.

Causes of Ischemic Stroke

1. **Narrowing of Blood Vessels (Thrombotic stroke):** This type of stroke happens when fatty deposits, or "plaques," form in the blood vessels that feed your brain. This is called atherosclerosis. This plaque can reduce or stop the blood flow to the brain.
2. **Blood Clotting in Brain (Embolic stroke):** This type of stroke happens when a blood clot gets stuck in an artery in the brain. The clot comes from another place, like the heart. The clot moves to the brain and gets stuck in an artery.
3. **Small Vessels (Lacunar stroke):** This type of stroke happens in very small vessels deep in the brain. Causes include long-standing high blood pressure, high blood sugar, and high cholesterol.
4. **Unknown Cause:** About 25% of the time, we do not know the cause. This is also called cryptogenic stroke.

Signs of a Stroke

- Sudden loss of strength or feeling on one side of the body or face
- Problems with speech and language
- Changes in vision or balance
- A terrible headache

Treatment

Treatment depends on the type of stroke and the areas of the brain affected. The goal is to save as much brain function as possible.

Tests

You will have many tests to find out the type of stroke you have had. Tests also help to figure out your risk factors for future strokes. Your doctor will decide which tests you need based on your case. This varies for everyone. This list includes most of the possible tests.

- **CT** (Computed Tomography): This test is done soon after you meet your doctors. It shows if there is bleeding in the brain.
- **CTA** (Computerized Tomography Angiogram): This test can give a better picture of the blood vessels than a standard CT. This test includes getting dye. The CTA can also show how clear the large blood vessels are in the neck. These are called the carotid arteries.
- **CTP** (Computed Tomography Perfusion): This test shows the blood flow in the brain.
- **MRI/MRA** (Magnetic Resonance Imaging/ Magnetic Resonance Angiography): These two tests may be done separately or together. The tests show where and how much tissue damage there is. Parts of this test may include getting dye. The MRA can also show how clear the large blood vessels are in the neck.
- **Telemetry**: This is done to check for heart rhythms that may be a cause of stroke.
- **EEG** (Electroencephalogram): This is a test to check brain wave activity and signs of seizure activity.
- **TTE** (Transthoracic Echocardiogram): This is done to check how the heart is working. It helps to find any openings between the chambers of the heart.
- **TEE** (Transesophageal Echocardiogram)**:** This test can give more details than a TTE if needed. It shows a different view of the heart.
- **Swallow Screen**: This is a test that all stroke patients will have before eating or drinking anything.

Medicines

A drug that breaks up clots, known as alteplase, may be given to you. Alteplase dissolves blood clots and can reduce the effects of a stroke. It cannot be given to everyone. It can only be given in the first 3 - 4 ½ hours after symptoms start.

Other reasons alteplase cannot be given:

- Recent heart attack
- Head trauma in the last 3 months
- Blood in your stools or urine in the last 21 days
- Surgery in the last 14 days
- Bleeding problems
- Use of blood thinners, such as warfarin or newer anticoagulants such as apixaban, rivaroxaban, or dabigatran
- Pregnancy
- High blood pressure

Risks of taking alteplase include bleeding in the brain or elsewhere in the body, and swelling of the face, tongue and throat.

Your doctors will also talk with you about other medicines to lower your risk of stroke in the future. These could include aspirin, which is a blood thinner, and cholesterol-lowering medicines.

Surgery
Based on the timing, area, and cause of the stroke, surgery may be an option. A thrombectomy is surgery to remove a blood clot. A carotid endarterectomy (kuh-ROT-id en-dahr-tuh-REK-tuh-mee) is surgery to remove blockages in the neck arteries.

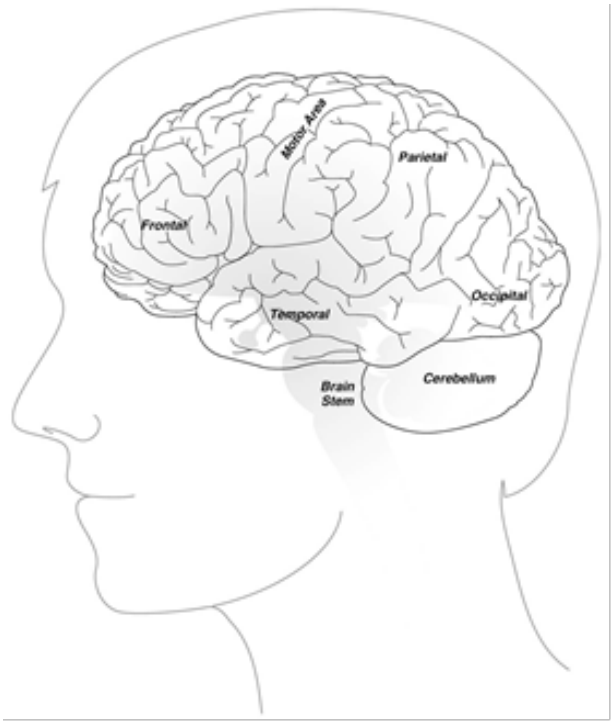
Brain Lobes and Effects of Stroke
The location and size of your stroke affects what functions will be lost or changed. The three main areas of the brain are the cerebrum, cerebellum and brain stem. Each area controls functions or skills.

Stroke in the Cerebrum
The cerebrum is divided into the left and right hemispheres. It is made up of four lobes: frontal, parietal, temporal, and occipital. The internal capsule and thalamus are areas deep in the brain. Each area controls different functions as noted below.

- **Frontal Lobe**
  - Movement
  - Reasoning and judgement
  - Personality
- **Parietal Lobe**
  - Sensation
  - Spatial awareness
- **Temporal Lobe**
  - Hearing
  - Language
  - Memory
- **Occipital Lobe**
  - Vision
- **Internal Capsule**
  - Movement
  - Sensation
- **Thalamus**
  - Sensation
  - Language
  - Memory
  - Motivation

Cerebellar Stroke
The **cerebellum** controls balance, coordination and fine motor movements. Effects of stroke may include:

- Dizziness
- Balance problems or unsteady walking
- Clumsiness or jerky movements in an arm or leg
- Slurred speech
- Nausea
- Vomiting
- Rapid movement of the eyes (nystagmus)



Brain Stem Stroke (Midbrain, Pons, Medulla)
The brain stem controls heart rate, breathing, and blood pressure. The brain stem also controls eye movement, hearing, speech, and swallowing. Effects of a stroke might include:

- Double or blurred vision.
- Dizziness.
- Swallowing problem.
- Slurred speech.
- Trouble breathing.
- Weakness or paralysis of arms and legs.
- Decreased levels of alertness.

Right-Brain Stroke
The right half (hemisphere) of the brain controls the movement on the left side of the body. A person with a right brain stroke may be weak or not able to move the left side of the body. Other effects may include:

- Trouble knowing how far or near an object is to the body.
- Neglect of left side of the body, or not able to see things to the left of the body.
- Poor decision making.
- Lack of insight into the changes in ability since the stroke, leading to safety concerns.
- Impulsiveness.
- Short attention span and slower learning of new things.
- Facial weakness, slurred speech, or problems swallowing.

Left-Brain Stroke
The left half (hemisphere) of the brain controls the right side of the body. A person with a left-brain stroke may be weak or not able to move the right side of the body. Other effects may include:

- Trouble speaking or understanding words spoken or written. This is called aphasia.
- Slow, careful movements.
- Not able to see things on the right side of the body.
- Facial weakness, unclear speech, or problems with swallowing.

Blood Vessels in the Brain
Blood in the brain flows in through four large blood vessels (arteries):

- Left and right internal carotid arteries. These run along the front of the neck.
- Left and right vertebral arteries. These run along the back of the neck.

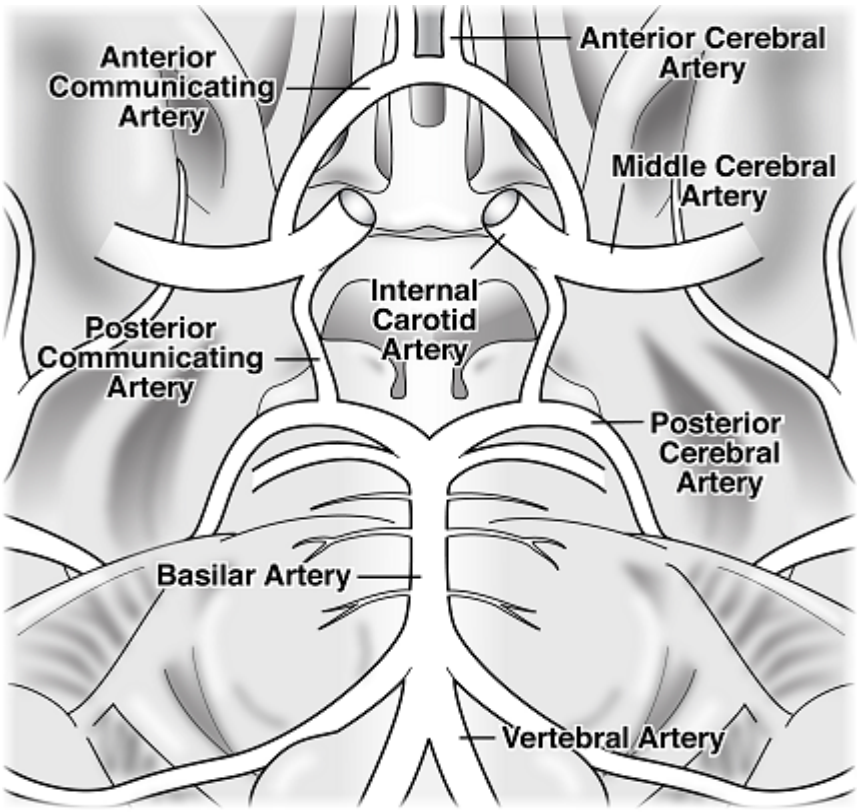
These carotid and vertebral arteries come together to form the Circle of Willis. These arteries branch off into smaller blood vessels and supply oxygen and nutrients to the brain. A stroke can happen in any of these blood vessels. The pictures on the next page show the blood vessels.

Arteries sending blood to the front part of the brain:

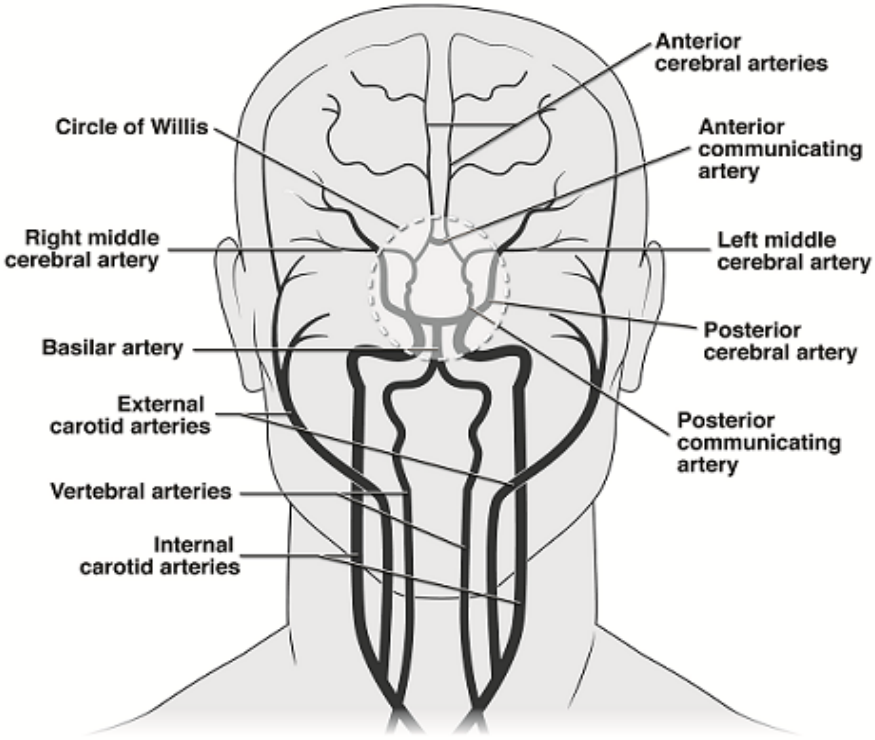
- Internal carotid arteries
- Middle cerebral arteries
- Anterior cerebral arteries
- Anterior communicating artery

Arteries sending blood to the back part of the brain:

- Vertebral arteries
- Basilar artery
- Posterior cerebral arteries
- Posterior communicating arteries



Arteries of the Brain



Changes After a Stroke
Many changes can happen after a stroke. Some of the possible changes are explained below.

Aphasia
Aphasia happens when there is damage to the parts of the brain that control language. A person with aphasia may have trouble speaking, understanding, reading, and/or writing. Aphasia is not a loss of intelligence.

People with aphasia may have other changes. These changes may include muscle weakness, decreased sensation, trouble swallowing, and/or trouble with attention and recall.

Aphasia can range from mild to severe. Someone with a mild case may only have a few problems thinking of the word he/she wants to say. Someone with a severe case may not be able to speak at all or understand any questions. A speech-language pathologist will work to find the language problems and provide treatment.

Expressive aphasia: This is when a person has trouble expressing himself/herself, either by speaking or writing. He/she may:

- Speak in single words.
- Speak in short phrases.
- Not say smaller words like “the” and “of.” Speech patterns may sound like a telegram (e.g., “go bed”).
- Put words in the wrong order (e.g., “The cake ate the girl.”).
- Switch sounds and words (e.g., bed is called table or dishwasher a "wish dasher").
- Make up words. This is also called jargon.

Receptive aphasia: This is when a person has trouble understanding what someone is saying or what he/she is reading. He/she may:

- Take extra time to answer questions or follow directions.
- Not know what words mean.
- Only understand short and simple statements.
- Not know what common sayings mean (example: “once in a blue moon”).
- Not be able to answer questions the right way.
- Not follow commands.

Feeling Tired After a Stroke
After a stroke, most people feel tired. This feeling can be overwhelming. It is not something that you can fight through. You will need more rest during the day. For most people, the feeling goes away after a few months.

You may have less energy than before. A stroke can change your sleeping habits, eating habits, and your activity level. Side effects of your medicines may lower your energy. Activities like dressing, talking, or walking take more effort. Changes in thinking and memory take effort. This all takes energy.

Loss of energy, interest, or enthusiasm occurs with a depressed mood. After a stroke, many people have depression. This can be treated. Talk with your doctor if you think you are depressed or if your fatigue continues beyond three months. Other reasons for feeling tired should be ruled out. Your doctor can check to see if your fatigue could be a side effect of your medicines.

How to Increase Your Energy

- Focus on your progress, rather than on what you cannot do. Celebrate your successes!
- Try naps or schedule rest times during the day. Rest as long as you need to feel refreshed.
- Learn to relax. Sometimes the harder you try to do something, the harder it is to do. You become tense, anxious, and frustrated. All of this takes more energy. If you can relax, you will waste less energy.
- Do something you enjoy each day. A positive outlook and having other good things going on helps to boost energy levels.

Feeling Emotional After a Stroke

Having a stroke can be very stressful. It happens suddenly but can have long-lasting effects. Stroke survivors respond with a range of emotions. Some people may be very sad, while others may seem quite cheerful. These emotions are part of coping.

The type and extent of feelings depend on the type stroke, your coping style, and how you coped in the past. Common feelings are frustration, anxiety, and anger. Some feel sad or do not care about things as much as before.

Emotions change over time. The way a person responds just after a stroke can be very different than the response weeks or months later. Knowing what to expect will help you to cope with the effects of the stroke. It will also help others to understand what you are going through.

Why Emotions Change After a Stroke

A stroke injures the brain. If the parts of the brain that handle emotions are injured, it changes the way the brain deals with emotions. Emotions may be hard to control soon after a stroke. Mood swings and depression are very common.

- **Mood swings:** A person might have rapid mood changes. You might hear this called emotional lability, reflex crying, or labile mood. For example, a person might suddenly cry but then quickly stop or even start laughing. During a mood swing, crying may not fit a person's mood. This often improves over time.
- **Post-stroke depression:** People may feel sad, powerless, inadequate, or irritable. Mild depression is more common with damage in the right/back area of the brain. Severe depression is more common with damage in the left/front area of the brain. Talk with your team about treatment if needed.

Many of these feelings are a natural part of adjusting to life after a stroke. Talking about the effects of the stroke and your feelings can help you and your family work through and process feelings. This is an important step in the process of this life change.

Agitation and Restlessness

Agitation often happens after brain trauma, or stroke. It can be a common part of recovery from an illness or injury. About 33% of people become agitated after a head injury. Agitation may include feelings such as anger or fear. It can include physical aggression such as striking out. Someone who is agitated may be confused and say things you know they don't mean. For example, if the person wakes up in a new place and doesn't know where they are, they may become scared and act out.

Agitation is common when there is a lot of activity. Someone with a brain injury can quickly become over-stimulated. The brain cannot process things fast enough to stay calm and relaxed. Just thinking or hearing sounds can overwhelm someone. Some triggers might be:

- Bright lights.
- TV or radio on.
- Noise in room or hallway (alarms, people talking, sudden noises).
- Too many guests.
- Health care equipment (IVs, feeding tubes, catheters, neck brace).
- Asking your loved one too many questions.
- Speaking in a loud voice or too fast.

Restlessness is different than agitation. It often happens after the agitation stage and is part of the recovery process. A person will have trouble sitting still, focusing, and thinking. Some may be impulsive and do things without thinking. The person may appear tense and uneasy, pace or fidget. It can be caused by too much or not enough stimulation.

What Family Can Do to Help

- Talk in a calm, quiet voice. It is not helpful to yell or argue. Someone with a brain injury is not able to reason.
- If your loved one starts yelling or acting out, call for help. Ensure your safety first.
- Take away things that may be distracting or stimulating. For example, keep the TV off.
- Limit guests and keep visits short. Rest is very important.
- Remind your loved one where they are and about their injuries. Do not quiz your loved one about what she remembers.
- Tell the care team what helps your loved one relax.

Recovery

Recovery starts right away. Staff will work with you to set up goals. Effects of a stroke on the brain can be long-lasting or slow to improve. Therapy can help increase independence. Therapists can help you figure out the next steps after a stroke.

- Physical therapists (PT) help you to walk or use a wheelchair.
- Occupational therapists (OT) help you strengthen your upper body and gain skills such as writing.
- Speech therapists help you learn new ways to keep track of thoughts and speak with others.
- Swallow therapists can help to ensure you get the right food so you don’t choke or get pneumonia.

Options for Rehabilitation
See below for some of the options. Choices depend on your care needs and insurance. A case manager or social worker will discuss these options with you.

1. **Acute Inpatient Rehab**
   - This is a hospital rehab center that provides intense therapy.
   - You must have a certain number of skilled rehab needs and be able to do 3 hours of therapy per day.
   - You will stay overnight.
2. **Skilled Nursing Facility (SNF) with Rehab**
   - This setting also provides rehab therapy.
   - It allows you to move along at a slower pace and build up strength for a more intense program, or to return to home.
   - You will stay overnight.
3. **Long-Term Acute Care Hospital (LTACH)**
   - This setting supports patients who need a lot of medical and nursing care.
   - Those with a brain injury and/or long-term breathing problems may need this option.
   - Rehab is less intense.
   - You will stay overnight.
4. **Outpatient Therapy**
   - You would receive therapy at a clinic 1-2 times per week (or more).
5. **Home Care**
   - A therapist comes to the home 1-2 times a week.
   - Patients must be homebound as defined by Medicare.

Prevent Another Stroke
Many factors increase the risk of stroke. Managing your risk factors helps protect against another stroke. See Health Fact for You #5736: Reducing Your Risk of Stroke for ideas and to make a plan.

Getting Ready for Discharge
As you get ready to leave the hospital, talk about the topics below with your health care team.

- ☐ **Plan for discharge**: Your health care team talks with you about your plan for discharge. This includes all health services.
- ☐ **Education**: The nurse will discuss information with you about stroke.
- ☐ **Discharge orders**: Your doctor writes your discharge orders.
- ☐ **Primary Care Provider (PCP)**: A plan is made to start care with a primary care doctor before you leave the hospital.
- ☐ **Medicines**: The pharmacist reviews your medicines (the name, purpose, dose, how to take it, and side effects).
- ☐ **Equipment and throw away supplies:** These may need to be ordered or brought to you. You may need dressing supplies, crutches, a walker, or a wheelchair. If needed, we can bill your insurance for a 3-day supply of one-time use supplies.
- ☐ **A ride**: You have a plan for a ride or have asked for help in getting a ride home.

Support Groups
Consider joining a support group. It can be helpful to hear from others who have been affected by stroke. Some options are listed, but you might find others in your area.

Madison Area Stroke Support Group
1st option:
- **When:** First Wednesday of every month
- **Time:** 6:00-8:00pm
- **Location:** Unity Point Health – Meriter, 202 S. Park St., 9 Tower Therapy Conference Room/Gym, Madison, WI 53715

2nd option:
- **When:** Third Wednesday of every month
- **Time:** 2:00-4:00pm
- **Location:** UW Health Rehabilitation Hospital, 5115 N. Biltmore Ln, Madison, WI 53718

Stroke Support Group Registry
Use this website to find support groups by zip code: www.strokeassociation.org
Select Help and Support > Stroke Support Group Finder

Websites
The websites below may provide helpful information and other support group options. Use websites that end in ".gov", ".edu", and ".org" to find the most trustworthy information.

American Stroke Association
1-800-4-Stroke (478-7653);
www.strokeassociation.org

American Heart Association
1-800-242-8721; www.heart.org

Caregiver Action Network
1-202-454-3970; www.caregiveraction.org/

Family Caregiver Alliance
1-415-434-3388; www.caregiver.org/

Help for Incontinent People, Inc.
1-800-252-3337; www.nafc.org/

National Aphasia Association
1-800-922-4622; www.aphasia.org/

National Brain Injury Association
1-703-761-0750; www.biausa.org/

National Institute on Neurological Disorders and Stroke
1-800-352-9424;
www.ninds.nih.gov/disorders

Wisconsin Stroke Coalition
www.dhs.wisconsin.gov/coverdell/strokecoalition.htm

UW Comprehensive Stroke Program
www.uwhealth.org/stroke/stroke-program/10636

Brain Injury Peer Visitor Association
1-770-330-8416;
www.braininjurypeervisitor.org

Ebling Library's Consumer Health Portal (website): a website from UW-Madison that has free health information.
http://researchguides.ebling.library.wisc.edu/consumerhealth