First aid

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# Stroke: First aid

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By Mayo Clinic Staff

A stroke happens when there's bleeding into the brain or when blood flow to the brain is blocked. When brain cells are deprived of essential nutrients, they start dying within minutes.

**Seek immediate medical help.** A stroke is a true emergency. The sooner treatment is given, the more likely it is that damage can be minimized. Every moment counts.

In the event of a possible stroke, use F.A.S.T. to help remember warning signs.

- **Face.** Does the face droop on one side when the person tries to smile?
- **Arms.** Is one arm lower when the person tries to raise both arms?
- **Speech.** Can the person repeat a simple sentence? Is speech slurred or hard to understand?
- **Time.** During a stroke every minute counts. If you see any of these signs, call 911 or your local emergency number right away.

Other signs and symptoms of a stroke, which come on suddenly, include:

- Weakness or numbness on one side of the body, including the face, arm or leg.
- Dimness, blurring or loss of vision, particularly in one eye. Or sudden double vision.
- Sudden, severe headache with no clear cause.
- Unexplained dizziness, unsteadiness or a sudden fall. Especially if dizziness is accompanied by any of the other signs or symptoms.

Having a stroke puts you at higher risk of having another. Risk factors also include having high blood pressure, smoking, having

diabetes and having heart disease. Your risk of stroke increases as you age.



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# Stroke

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## Overview

**What is a stroke? A Mayo Clinic expert explains**

Learn more from neurologist Robert D. Brown, Jr. M.D., M.P.H.

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An ischemic stroke occurs when the blood supply to part of the brain is blocked or reduced. This prevents brain tissue from getting oxygen and nutrients. Brain cells begin to die in minutes. Another type of stroke is a hemorrhagic stroke. It occurs when a blood vessel in the brain leaks or bursts and causes bleeding in the brain. The blood increases pressure on brain cells and damages them.

A stroke is a medical emergency. It's crucial to get medical treatment right away. Getting emergency medical help quickly can reduce brain damage and other stroke complications.

The good news is that fewer Americans die of stroke now than in the past. Effective treatments also can help prevent disability from stroke.



# Symptoms

If you or someone you're with may be having a stroke, pay attention to the time the symptoms began. Some treatments are most effective when given soon after a stroke begins.

Symptoms of stroke include:

- **Trouble speaking and understanding what others are saying.** A person having a stroke may be confused, slur words or may not be able to understand speech.
- **Numbness, weakness or paralysis in the face, arm or leg.** This often affects just one side of the body. The person can try to raise both arms over the

head. If one arm begins to fall, it may be a sign of a stroke. Also, one side of the mouth may droop when trying to smile.

- **Problems seeing in one or both eyes.** The person may suddenly have blurred or blackened vision in one or both eyes. Or the person may see double.
- **Headache.** A sudden, severe headache may be a symptom of a stroke. Vomiting, dizziness and a change in consciousness may occur with the headache.
- **Trouble walking.** Someone having a stroke may stumble or lose balance or coordination.

## When to see a doctor

**Seek immediate medical attention** if you notice any symptoms of a stroke, even if they seem to come and go or they disappear completely. Think "FAST" and do the following:

- **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? Or is one arm unable to rise?
- **Speech.** Ask the person to repeat a simple phrase. Is the person's speech slurred or different from usual?
- **Time.** If you see any of these signs, call 911 or emergency medical help right away.

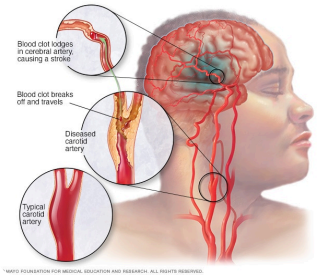
Call 911 or your local emergency number immediately. Don't wait to see if symptoms stop. Every minute counts. The longer a stroke goes untreated, the greater the potential for brain damage and disability.

If you're with someone you suspect is having a stroke, watch the person carefully while waiting for emergency assistance.

# Causes

There are two main causes of stroke. An ischemic stroke is caused by a blocked artery in the brain. A hemorrhagic stroke is caused by leaking or bursting of a blood vessel in the brain. Some people may have only a temporary disruption of blood flow to the brain, known as a transient ischemic attack (TIA). A TIA doesn't cause lasting symptoms.

## Ischemic stroke




**Ischemic stroke**

Enlarge image

This is the most common type of stroke. It happens when the brain's blood vessels become narrowed or blocked. This causes reduced blood flow, known as ischemia. Blocked or narrowed blood vessels can be caused by fatty deposits that build up in blood vessels. Or they can be caused by blood clots or other debris that travel through the bloodstream, most often from the heart. An ischemic stroke occurs when fatty deposits, blood clots or other debris become lodged in the blood vessels in the brain.

Some early research shows that COVID-19 infection may increase the risk of ischemic stroke, but more study is needed.

## Hemorrhagic stroke

Hemorrhagic stroke occurs when a blood vessel in the brain leaks or ruptures. Bleeding inside the brain, known as a brain hemorrhage, can result from many conditions that affect the blood vessels. Factors related to hemorrhagic stroke include:

- High blood pressure that's not under control.
- Overtreatment with blood thinners, also known as anticoagulants.
- Bulges at weak spots in the blood vessel walls, known as aneurysms.
- Head trauma, such as from a car accident.
- Protein deposits in blood vessel walls that lead to weakness in the vessel wall. This is known as cerebral amyloid angiopathy.
- Ischemic stroke that leads to a brain hemorrhage.

A less common cause of bleeding in the brain is the rupture of an arteriovenous malformation (AVM). An AVM is an irregular tangle of thin-walled blood vessels.

## Transient ischemic attack

A transient ischemic attack (TIA) is a temporary period of symptoms similar to those of a stroke. But a TIA doesn't cause permanent damage. A TIA is cause

a temporary decrease in blood supply to part of the brain. The decrease may last as little as five minutes. A transient ischemic attack is sometimes known as a ministroke.

A TIA occurs when a blood clot or fatty deposit reduces or blocks blood flow to part of the nervous system.

Seek emergency care even if you think you've had a TIA. It's not possible to tell if you're having a stroke or TIA based only on the symptoms. If you've had a TIA, it means you may have a partially blocked or narrowed artery leading to the brain. Having a TIA increases your risk of having a stroke later.

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# Risk factors

Many factors can increase the risk of stroke. Potentially treatable stroke risk factors include:

## Lifestyle risk factors

- Being overweight or obese.
- Physical inactivity.
- Heavy or binge drinking.
- Use of illegal drugs such as cocaine and methamphetamine.

## Medical risk factors

- High blood pressure.
- Cigarette smoking or secondhand smoke exposure.
- High cholesterol.
- Diabetes.

- Obstructive sleep apnea.
- Cardiovascular disease, including heart failure, heart defects, heart infection or irregular heart rhythm, such as atrial fibrillation.
- Personal or family history of stroke, heart attack or transient ischemic attack.
- COVID-19 infection.

Other factors associated with a higher risk of stroke include:

- **Age** — People age 55 or older have a higher risk of stroke than do younger people.
- **Race or ethnicity** — African American and Hispanic people have a higher risk of stroke than do people of other races or ethnicities.
- **Sex** — Men have a higher risk of stroke than do women. Women are usually older when they have strokes, and they're more likely to die of strokes than are men.
- **Hormones** — Taking birth control pills or hormone therapies that include estrogen can increase risk.

## Complications

A stroke can sometimes cause temporary or permanent disabilities. Complications depend on how long the brain lacks blood flow and which part is affected. Complications may include:

- **Loss of muscle movement, known as paralysis.** You may become paralyzed on one side of the body. Or you may lose control of certain muscles, such as those on one side of the face or one arm.
- **Trouble talking or swallowing.** A stroke might affect the muscles in the mouth and throat. This can make it hard to talk clearly, swallow or eat. Yo

also may have trouble with language, including speaking or understanding speech, reading or writing.

- **Memory loss or trouble thinking.** Many people who have had strokes experience some memory loss. Others may have trouble thinking, reasoning, making judgments and understanding concepts.
- **Emotional symptoms.** People who have had strokes may have more trouble controlling their emotions. Or they may develop depression.
- **Pain.** Pain, numbness or other feelings may occur in the parts of the body affected by stroke. If a stroke causes you to lose feeling in the left arm, you may develop a tingling sensation in that arm.
- **Changes in behavior and self-care.** People who have had strokes may become more withdrawn. They also may need help with grooming and daily chores.

## Prevention

You can take steps to prevent a stroke. It's important to know your stroke risk factors and follow the advice of your healthcare professional about healthy lifestyle strategies. If you've had a stroke, these measures might help prevent another stroke. If you have had a transient ischemic attack (TIA), these steps can help lower your risk of a stroke. The follow-up care you receive in the hospital and afterward also may play a role.

Many stroke prevention strategies are the same as strategies to prevent heart disease. In general, healthy lifestyle recommendations include:

- **Control high blood pressure, known as hypertension.** This is one of the most important things you can do to reduce your stroke risk. If you've had a stroke, lowering your blood pressure can help prevent a TIA or stroke in the future. Healthy lifestyle changes and medicines often are used to treat high blood pressure.

- **Lower the amount of cholesterol and saturated fat in your diet.** Eating less cholesterol and fat, especially saturated fats and trans fats, may reduce buildup in the arteries. If you can't control your cholesterol through dietary changes alone, you may need a cholesterol-lowering medicine.
- **Quit tobacco use.** Smoking raises the risk of stroke for smokers and nonsmokers exposed to secondhand smoke. Quitting lowers your risk of stroke.
- **Manage diabetes.** Diet, exercise and losing weight can help you keep your blood sugar in a healthy range. If lifestyle factors aren't enough to control blood sugar, you may be prescribed diabetes medicine.
- **Maintain a healthy weight.** Being overweight contributes to other stroke risk factors, such as high blood pressure, cardiovascular disease and diabetes.
- **Eat a diet rich in fruits and vegetables.** Eating five or more servings of fruits or vegetables every day may reduce the risk of stroke. The Mediterranean diet, which emphasizes olive oil, fruit, nuts, vegetables and whole grains, may be helpful.
- **Exercise regularly.** Aerobic exercise reduces the risk of stroke in many ways. Exercise can lower blood pressure, increase the levels of good cholesterol, and improve the overall health of the blood vessels and heart. It also helps you lose weight, control diabetes and reduce stress. Gradually work up to at least 30 minutes of moderate physical activity on most or all days of the week. The American Heart association recommends getting 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous aerobic activity a week. Moderate intensity activities can include walking, jogging, swimming and bicycling.
- **Drink alcohol in moderation, if at all.** Drinking large amounts of alcohol increases the risk of high blood pressure, ischemic strokes and hemorrhagic strokes. Alcohol also may interact with other medicines you're taking. However, drinking small to moderate amounts of alcohol may help prevent ischemic stroke and decrease the blood's clotting tendency. A small to moderate amount is about one drink a day. Talk to your healthcare professional about what's appropriate for you.

- **Treat obstructive sleep apnea (OSA).** OSA is a sleep disorder that causes you to stop breathing for short periods several times during sleep. Your healthcare professional may recommend a sleep study if you have symptoms of OSA. Treatment includes a device that delivers positive airway pressure through a mask to keep the airway open while you sleep.
- **Don't use illicit drugs.** Certain illicit drugs such as cocaine and methamphetamine are established risk factors for a TIA or a stroke.

## Preventive medicines

If you have had an ischemic stroke, you may need medicines to help lower your risk of having another stroke. If you have had a TIA, medicines can lower your risk of having a stroke in the future. These medicines may include:

- **Anti-platelet drugs.** Platelets are cells in the blood that form clots. Anti-platelet medicines make these cells less sticky and less likely to clot. The most commonly used anti-platelet medicine is aspirin. Your healthcare professional can recommend the right dose of aspirin for you.

  If you've had a TIA or minor stroke, you may take both an aspirin and an anti-platelet medicine such as clopidogrel (Plavix). These medicines may be prescribed for a period of time to reduce the risk of another stroke. If you can't take aspirin, you may be prescribed clopidogrel alone. Ticagrelor (Brilinta) is another anti-platelet medicine that can be used for stroke prevention.
- **Blooding-thinning medicines, known as anticoagulants.** These medicines reduce blood clotting. Heparin is a fast-acting anticoagulant that may be used short-term in the hospital.

  Slower acting warfarin (Jantoven) may be used over a longer term. Warfarin is a powerful blood-thinning medicine, so you need to take it exactly as directed and watch for side effects. You also need regular blood tests to monitor warfarin's effects.

Several newer blood-thinning medicines are available to prevent strokes in people who have a high risk. These medicines include dabigatran (Pradaxa), rivaroxaban (Xarelto), apixaban (Eliquis) and edoxaban (Savaysa). They work faster than warfarin and usually don't require regular blood tests or monitoring by your healthcare professional. These medicines also are associated with a lower risk of bleeding complications compared to warfarin.

By Mayo Clinic Staff

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Diagnosis & treatment

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# Stroke



## Diagnosis

**Strokes FAQ Neurologist Robert D. Brown, Jr. M.D., M.P.H., answers the most frequently asked questions about strokes.**

Ask Mayo Clinic: Strokes

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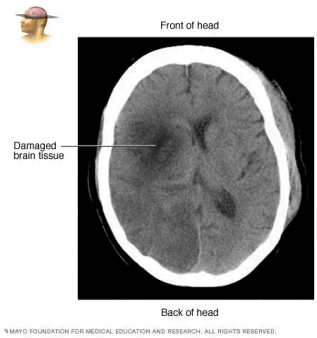
During a stroke, things move quickly once you get to the hospital. Your emergency team works to learn what type of stroke you're having. You'll likely have a CT scan or other imaging test soon after arrival. Healthcare professionals also need to rule out other possible causes of your symptoms, such as a brain tumor or a drug reaction.

**Stroke consultation**
Stroke consultation at Mayo Clinic

## Tests




**CT scan of brain tissue damaged by stroke**
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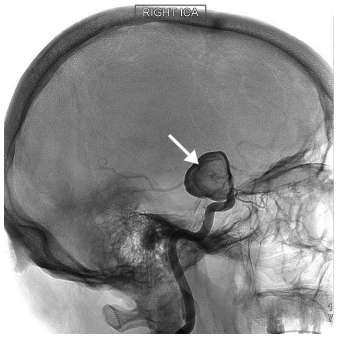


**Cerebral angiogram**

Enlarge image

Some of the tests you may have include:

- **A physical exam.** A healthcare professional does several tests, including listening to your heart and checking your blood pressure. A neurological exam looks at how a potential stroke is affecting your nervous system.
- **Blood tests.** You may need tests to check how fast your blood clots and whether your blood sugar is too high or low. You also may be tested to see if you have an infection.
- **Computerized tomography (CT) scan.** A CT scan uses a series of X-rays to create a detailed image of your brain. A CT scan can show bleeding in the brain, an ischemic stroke, a tumor or other conditions. You might have a dye injected into your bloodstream to view the blood vessels in the neck and brain in greater detail. This type of test is called a computerized tomography angiography.
- **Magnetic resonance imaging (MRI).** An MRI uses powerful radio waves and a magnetic field to create a detailed view of the brain. The test can detect brain tissue damaged by an ischemic stroke and brain hemorrhages. Sometimes a dye is injected into a blood vessel to view the arteries and veins and highlight blood flow. This test is called magnetic resonance angiography or magnetic resonance venography.
- **Carotid ultrasound.** In this test, sound waves create detailed images of the inside of the carotid arteries in the neck. A carotid ultrasound can show buildup of fatty deposits called plaques and blood flow in the carotid arteries.
- **Cerebral angiogram.** This test is less common, but it provides a detailed view of arteries in the brain and neck. A thin, flexible tube called a cathet

inserted through a small incision, usually in the groin. The tube is guided through the major arteries and into the carotid or vertebral artery in the neck. Then a dye is injected into the blood vessels to make the arteries visible under X-ray imaging.

- **Echocardiogram.** An echocardiogram uses sound waves to create detailed images of the heart. An echocardiogram can find a source of clots in the heart that may have traveled to the brain and caused a stroke.

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# Treatment

Emergency treatment depends on whether you're having an ischemic or hemorrhagic stroke. During an ischemic stroke, blood vessels in the brain are blocked or narrowed. During a hemorrhagic stroke, there's bleeding into the brain.

## Ischemic stroke

To treat an ischemic stroke, blood flow must quickly be restored to the brain. This may be done with:

- **Emergency IV medicine.** An IV medicine that can break up a clot has to be given within 4.5 hours from when symptoms began. The sooner the medicine is given, the better. Quick treatment improves your chances of survival and may reduce complications.

  An IV injection of recombinant tissue plasminogen activator (TPA) is the gold standard treatment for ischemic stroke. The two types of TPA are alteplase (Activase) and tenecteplase (TNKase). An injection of TPA is usually given through a vein in the arm within the first three hours. Sometimes, TPA can be given up to 4.5 hours after stroke symptoms started.

  This medicine restores blood flow by dissolving the blood clot causing the stroke. By quickly removing the cause of the stroke, it may help people recover more fully from a stroke. Your healthcare professional considers certain risks, such as potential bleeding in the brain, to determine whether TPA is appropriate for you.

- **Emergency endovascular procedures.** Healthcare professionals sometimes treat ischemic strokes directly inside the blocked blood vessel. Endovascular therapy has been shown to improve outcomes and reduce long-term disability after ischemic stroke. These procedures must be performed as soon as possible:

  - **Medicines delivered directly to the brain.** During this procedure, a long, thin tube called a catheter is inserted through an artery in the groin. The catheter is moved through the arteries to the brain to deliver TPA directly where the stroke is happening. The time window for this treatment is somewhat longer than for injected TPA but is still limited.

  - **Removing the clot with a stent retriever.** A device attached to a catheter can directly remove the clot from the blocked blood vessel in the brain. This procedure is especially helpful for people with large clots

that can't be completely dissolved with TPA. This procedure often is performed in combination with injected TPA.

The time window when these procedures can be considered has been expanding due to newer imaging technology. Perfusion imaging tests done with CT or MRI help determine if that someone may benefit from endovascular therapy.

## Other procedures

Your healthcare professional may recommend a procedure to open up an artery that is narrowed by plaque. This type of procedure is done to lower your risk of having another stroke or transient ischemic attack. Options vary, but include:

- **Carotid endarterectomy.** Carotid arteries are the blood vessels that run along each side of the neck, supplying the brain with blood. This surgery removes the plaque blocking a carotid artery and may reduce the risk of ischemic stroke. A carotid endarterectomy also involves risks, especially for people with heart disease or other medical conditions.
- **Angioplasty and stents.** In an angioplasty, a surgeon threads a catheter to the carotid arteries through an artery in the groin. A balloon is then inflated to expand the narrowed artery. Then a stent can be inserted to support the opened artery.

## Hemorrhagic stroke

Emergency treatment of hemorrhagic stroke focuses on controlling the bleeding and reducing pressure in the brain caused by excess fluid.

## Emergency measures

If you take blood-thinning medicines to prevent blood clots, you may be given treatment to counteract the blood thinners' effects. These treatments include medicines or a transfusion of blood products. Medicines also can lower the

pressure in your brain, lower blood pressure, prevent spasms of the blood vessels and prevent seizures.

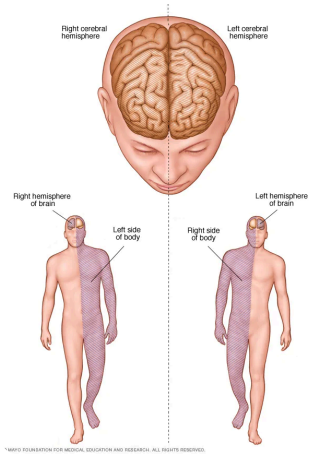
## Surgery

If the area of bleeding is large, you may need surgery to remove the blood and relieve pressure on your brain. Surgery also may be used to repair blood vessel damage associated with hemorrhagic strokes.

Your healthcare professional may recommend one of these procedures if an aneurysm, arteriovenous malformation (AVM) or other blood vessel condition caused the stroke.

- **Surgical clipping.** A surgeon places a tiny clamp at the base of an aneurysm to stop blood flow to it. An aneurysm is a bulge at a weak spot in a blood vessel. The clamp can keep the aneurysm from bursting. Or the clamp can keep an aneurysm that has recently burst from bleeding again.
- **Coiling, also known as endovascular embolization.** A catheter is inserted into an artery in the groin and guided to the brain. Using the catheter, a surgeon places tiny coils into the aneurysm to fill it. This blocks blood flow into the aneurysm and causes blood to clot.
- **Surgical removal of a tangle of thin-walled blood vessels, known as an AVM.** Surgeons may remove a smaller AVM if it's in an area of the brain that's easy to access. This removes the risk of rupture and lowers the risk of hemorrhagic stroke. However, it's not always possible to remove an AVM if it's deep within the brain or if it's large. It also may not be possible to remove if the procedure would impact brain function.
- **Stereotactic radiosurgery.** This procedure uses multiple beams of highly focused radiation to repair blood vessel malformations. Stereotactic radiosurgery is an advanced treatment that's not as invasive as other procedures.

## Stroke recovery and rehabilitation




**Brain hemisphere connections**

Enlarge image

After emergency treatment, you're closely monitored for at least a day. After that, stroke care focuses on helping you recover as much function as possible and to return to independent living. The impact of the stroke depends on the area of the brain involved and the amount of tissue damaged.

If the stroke affected the right side of the brain, movement and feeling on the left side of your body may be affected. If the stroke damaged the left side of the brain, movement and feeling on the right side of your body may be affected. Brain damage to the left side of the brain also may cause speech and language disorders.

Most people who have had a stroke go to a rehabilitation program. Your healthcare professional can recommend the therapy program that is right for you. A program is recommended based on your age, overall health and degree of disability from the stroke. Your lifestyle, interests, priorities and whether you have help from family members or caregivers are considered.

Rehabilitation may begin before you leave the hospital. After discharge, you might continue the program in a rehabilitation unit of the same hospital. Or you may go to another rehabilitation unit or to a skilled nursing facility as an outpatient. You also might have rehabilitation at home.

Every person's stroke recovery is different. Depending on your condition, your treatment team may include:

- Doctor trained in brain conditions, known as a neurologist.

- Rehabilitation doctor, known as a physiatrist.
- Rehabilitation nurse.
- Dietitian.
- Physical therapist.
- Occupational therapist.
- Recreational therapist.
- Speech pathologist.
- Social worker or case manager.
- Psychologist or psychiatrist.
- Chaplain.

Speech therapy is often a part of stroke rehabilitation.

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# Treatment outcomes

One way to evaluate the care of patients diagnosed with stroke is to look at the percentage of patients receiving the timely and effective care measures that are appropriate.

The graphs below display the percentage of eligible Mayo Clinic patients diagnosed with stroke receiving all of the appropriate care measures.

## Stroke Core Measure

See related graph.

## Carotid Endarterectomy Mortality

See related graph.

## Carotid Stenting Mortality

See related graph.

## Comprehensive Stroke Measure

See related graph.

## Comprehensive Stroke – Arrival Time to Skin Puncture

See related graph.

### Comprehensive Stroke – Timeliness of IV t-PA Therapy

See related graph.

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# Coping and support

A stroke is a life-changing event that can affect your emotional well-being as much as your physical function. Some people may feel frustrated or depressed. A stroke may cause mood changes and a lower sex drive.

Maintaining your self-esteem, connections to others and interest in the world are essential parts of your recovery. Several strategies may help you and your caregivers, including:

- **Don't be hard on yourself.** Physical and emotional recovery involves tough work and takes time. Celebrate your progress. Allow time for rest.
- **Join a support group.** Meeting with others recovering from a stroke lets you get out and share experiences. You also can exchange information and build new friendships.
- **Let friends and family know what you need.** People may want to help, but they may not know what to do. Let them know how they can help. You might ask that they bring over a meal and stay to eat with you and talk. Or you might ask that they attend social events or religious activities with you.

## Communication challenges

Speech and language can be hard after a stroke. Here are some tips to help you and your caregivers cope with communication challenges:

- **Practice.** Try to have a conversation at least once a day. It can help you learn what works best for you. It also can help you feel connected and rebuild your confidence.
- **Relax and take your time.** Talking may be easiest and most enjoyable in a relaxing situation when you're not rushed. Some people who have had a stroke find that after dinner is a good time for conversation.
- **Say it your way.** When you're recovering from a stroke, you may need to use fewer words. Rely on gestures or use your tone of voice to communicate.

- **Use props and communication aids.** You may find it helpful to use cue cards to communicate. Cue cards might include words used often. Or they might include pictures of close friends and family members, a favorite television show, the bathroom, or other wants and needs.

# Preparing for your appointment

A stroke in progress is usually diagnosed in a hospital. If you're having a stroke, your immediate care focuses on reducing brain damage. If you haven't had a stroke but you're worried about your risk, talk to your healthcare professional at your next appointment.

## What to expect from your doctor

In the emergency room, you may see an emergency medicine specialist or a doctor trained in brain conditions, known as a neurologist. Nurses and medical technicians also are likely to be involved in your care.

Your emergency team's first priority is to stabilize your symptoms and overall medical condition. Then the team determines if you're having a stroke. Healthcare professionals try to find the cause of the stroke to determine the proper treatment.

If you're seeking medical advice during a scheduled appointment, your healthcare professional considers your risk factors for stroke and heart disease. Your healthcare professional can offer advice on how to lower your risk. This may include lifestyle strategies, stopping smoking or not using illicit drugs. Your healthcare professional also may consider if you need medicines to control high blood pressure, cholesterol and other stroke risk factors.

By Mayo Clinic Staff

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# Transient ischemic attack (TIA)



## Overview

A transient ischemic attack (TIA) is a short period of symptoms similar to those of a stroke. It's caused by a brief blockage of blood flow to the brain. A TIA usually lasts only a few minutes and doesn't cause long-term damage.

However, a TIA may be a warning. About 1 in 3 people who has a TIA will eventually have a stroke, with about half occurring within a year after the TIA.

Often called a ministroke, a TIA can serve as both a warning of a future stroke and a chance to prevent it.

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## Symptoms

Transient ischemic attacks usually last a few minutes. Most symptoms disappear within an hour. Rarely, symptoms may last up to 24 hours. The symptoms of a TIA are similar to those found early in a stroke. Symptoms happen suddenly and may include:

- Weakness, numbness or paralysis in the face, arm or leg, typically on one side of the body.
- Slurred speech or trouble understanding others.
- Blindness in one or both eyes or double vision.
- Dizziness or loss of balance or coordination.

You may have more than one TIA. Their symptoms may be similar or different depending on which area of the brain is involved.

## When to see a doctor

If you think you're having or have had a transient ischemic attack, get medical attention right away. TIAs most often occur hours or days before a stroke. Being evaluated quickly means healthcare professionals can pinpoint potential treatable conditions. Treating those conditions may help you prevent a stroke.

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# Causes

The cause of a transient ischemic attack is similar to the cause of an ischemic stroke, which is the most common type of stroke. In an ischemic stroke, a blood clot blocks the blood supply to part of the brain. In a TIA, unlike a stroke, the blockage is brief and there is no permanent damage.

The blockage that occurs during a TIA often results from a buildup of cholesterol-containing fatty deposits called plaques in an artery. This is known as atherosclerosis. The buildup also may occur in an artery's branches that supply oxygen and nutrients to the brain.

Plaques can decrease the blood flow through an artery or lead to the development of a clot. A blood clot that moves from another part of the body, such as the heart, to an artery that supplies the brain also may cause a TIA.

# Risk factors

Some risk factors of a transient ischemic attack and stroke can't be changed. Others you can control.

## Risk factors you can't change

You can't change these risk factors of a TIA and stroke. But knowing you have these risks can motivate you to change the risk factors you can control.

- **Family history.** Your risk may be greater if one of your family members has had a TIA or a stroke.
- **Age.** Your risk increases as you get older, especially after age 55.
- **Sex.** Men have a slightly higher risk of a TIA and a stroke. But as women age, their risk of a stroke goes up.
- **Prior transient ischemic attack.** If you've had one or more TIAs, you're much more likely to have a stroke.
- **Sickle cell disease.** Stroke is a frequent complication of sickle cell disease, also known as sickle cell anemia. Sickle-shaped blood cells carry less oxygen and also tend to get stuck in artery walls, affecting blood flow to the brain. But with proper treatment of sickle cell disease, you can lower your risk of a stroke.

## Risk factors you can control

You can control or treat a number of risk factors of a TIA and a stroke, including certain health conditions and lifestyle choices. Having one or more of these risk factors doesn't mean you'll have a stroke, but your risk increases if you have two or more of them.

## Health conditions

- **High blood pressure.** The risk of a stroke begins to increase at blood pressure readings of 140/90 millimeters of mercury (mm Hg) and higher. Your healthcare professional can help you decide on a target blood pressure based on your age and other factors, such as whether you have diabetes.
- **High cholesterol.** Eating less cholesterol and fat, especially saturated fat and trans fat, may reduce the plaques in your arteries. If you can't control your

cholesterol through dietary changes alone, your provider may prescribe a statin or another type of cholesterol-lowering medicine.

- **Cardiovascular disease.** This includes heart failure, a heart defect, a heart infection or a heart rhythm condition.
- **Carotid artery disease.** In this condition, the blood vessels in the neck that lead to the brain become clogged.
- **Peripheral artery disease (PAD).** PAD causes the blood vessels that carry blood to the arms and legs to become clogged.
- **Diabetes.** Diabetes speeds up and worsens the narrowing of arteries due to a buildup of fatty deposits, known as atherosclerosis.
- **High levels of homocysteine.** Elevated levels of this amino acid in the blood can cause the arteries to thicken and scar. This makes them more susceptible to clots.
- **Excess weight.** Obesity, especially carrying extra weight in the stomach, increases stroke risk.
- **COVID-19.** There is evidence that the virus that causes COVID-19 may raise the risk of stroke.

## Lifestyle choices

- **Cigarette smoking.** Smoking increases the risk of blood clots, raises blood pressure and plays a part in the development of atherosclerosis. But quitting smoking lowers the risk of having a TIA or a stroke.
- **Physical inactivity.** Engaging in 30 minutes of moderate-intensity exercise most days helps lower risk.
- **Poor nutrition.** Eating less fat and salt decreases the risk of a TIA and a stroke.
- **Heavy drinking.** If you drink alcohol, limit yourself to up to one drink a day for women and up to two drinks a day for men.

- **Use of illicit drugs.** Avoid cocaine and other illicit drugs.

## Prevention

Knowing your risk factors and living healthfully are the best things you can do to prevent a transient ischemic attack. A healthy lifestyle includes getting regular medical checkups. Also:

- **Don't smoke.** Stopping smoking reduces your risk of a TIA or a stroke.
- **Limit cholesterol and fat.** Cutting back on cholesterol and fat, especially saturated fat and trans fat, in your diet may reduce buildup of plaques in the arteries.
- **Eat plenty of fruits and vegetables.** These foods contain nutrients such as potassium, folate and antioxidants, which may protect against a TIA or a stroke.
- **Limit sodium.** If you have high blood pressure, avoid salty foods and don't add salt to food. These habits may help reduce your blood pressure. Limiting salt may not prevent high blood pressure, but excess sodium may increase blood pressure in some people.
- **Exercise regularly.** If you have high blood pressure, regular exercise is one of the few ways you can lower your blood pressure without medicines.
- **Limit alcohol intake.** Drink alcohol in moderation, if at all. The recommended limit is no more than one drink daily for women and two drinks a day for men.
- **Maintain a healthy weight.** Being overweight contributes to other risk factors, such as high blood pressure, cardiovascular disease and diabetes. Losing weight with diet and exercise may lower your blood pressure and improve your cholesterol levels.
- **Don't use illicit drugs.** Illicit drugs such as cocaine are associated with an increased risk of a TIA or a stroke.

- **Control diabetes.** You can manage diabetes and high blood pressure with diet, exercise, weight control and, when necessary, medicine.

By Mayo Clinic Staff

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