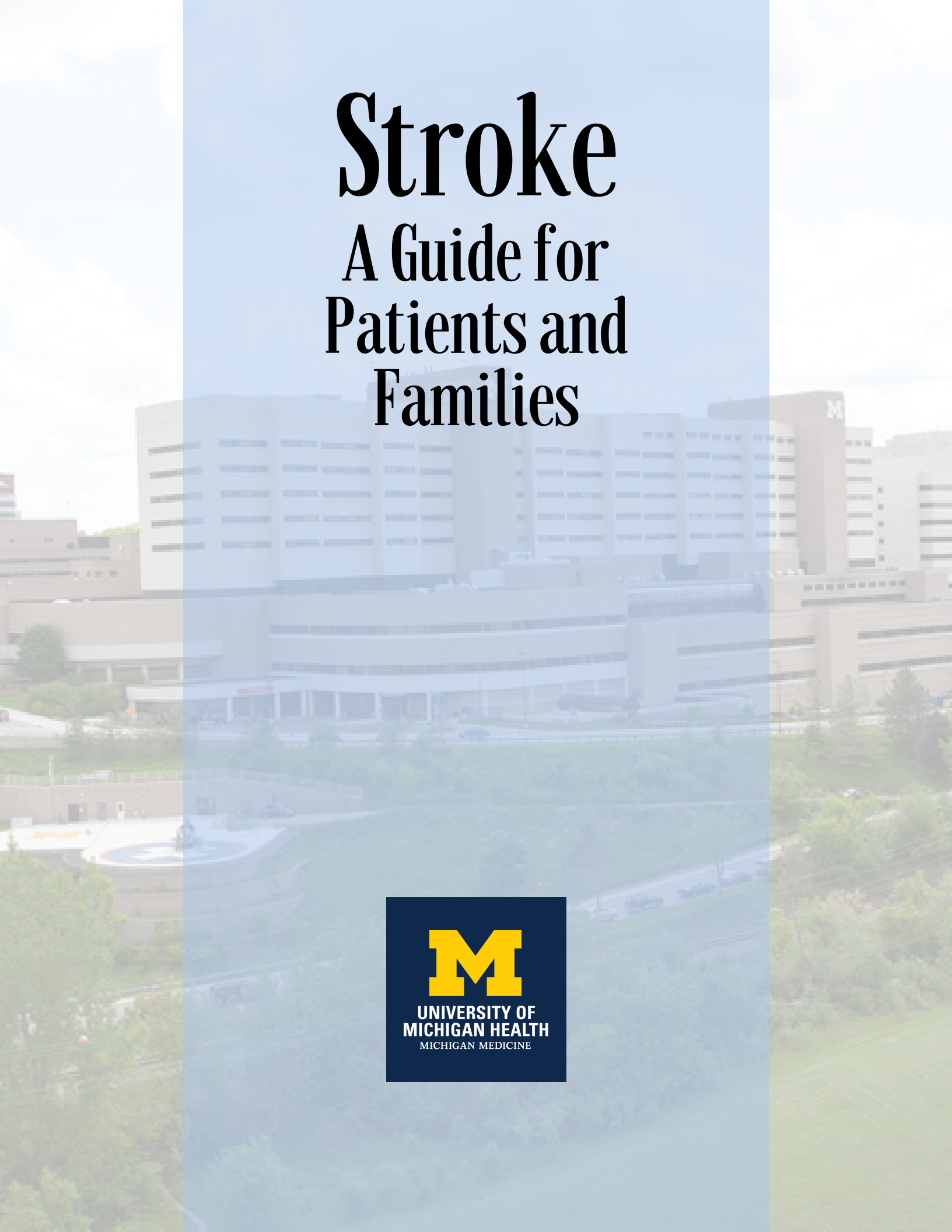
Stroke

A Guide for Patients and Families



UNIVERSITY OF MICHIGAN HEALTH
MICHIGAN MEDICINE

Welcome to University of Michigan Health

The patients at the University of Michigan Comprehensive Stroke Center are treated by emergency medicine, neurology, neurosurgery and neurointerventional radiology doctors who are specially trained in stroke care. Vascular surgeons, cardiologists, internal medicine, and physical medicine and rehabilitation doctors are also part of the care team allowing U-M to offer care for those with a minor stroke to those in a more complex situation. Our team treats patients before, during and after suffering a stroke, through preventive, emergent and rehabilitative care.

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Welcome to the
University of Michigan Health System
Comprehensive Stroke Center

As a Comprehensive Stroke Center (CSC), we strive to provide high quality evidence based care. Our highly trained staff work together to offer expertise and resources to make your hospital stay and discharge transition as comfortable and successful as possible.

All of our faculty and staff are committed to ensuring your care is patient and family centered. You are a valued patient and an important member of the healthcare team. We expect that you and your family will have lots of questions during the hospital stay and post discharge. This binder was designed to answer many of your questions. Please feel free to ask any members of the healthcare team for further information or assistance at any time.

Thank you for allowing us to participate in your care!

UNIVERSITY OF
MICHIGAN HOSPITAL
MICHIGAN MEDICINE

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

Michigan Medicine Phone Numbers

Billing 855-855-0863

or 734-615-0863

Office of Patient Relations (concerns):.....877-285-7788

Guest Assistance Program (GAP) (accommodations) 800-888-9825

Hospital Operator 734-936-4000

Lost & Found 734-936-7890

Mardigian Wellness Resource Center 734-232-4120

Parking & Transportation 734-764-7474

Registration & Insurance Verification 866-452-9896

Hotels (Med-Inn).....800-544-8684

or 734-936-0100

If the Med-Inn does not have a room, they will assist you in finding a local hotel. They will also make sure you receive a discounted price.

Spiritual Care.....734-936-4041

Medical Records.....734- 936-5490

Patient Care Units

Emergency Department 734-936-6666

UH - 4A (Neurology).....734-936-6486

UH- 4AS (Stroke Unit) 734-936-8689

UH – 4B.....734-936-2703

UH-4NI (Neurointensive Care Unit) 734-936-6520

6A Adult Rehabilitation Unit ……734-936-6256

Care Management……..734-764-0589

Social Work ……..…1-800-888-9825

Outpatient Areas

Primary Care Provider (PCP) Referral Line (MLINE) 800-962-3555

Cerebrovascular Clinic (Stroke Clinic) 888-287-1082

Neurosurgery 734-936-7010

Neurology…….....734-936-9020

Anti-coagulation Service ……734-998-6944

Testing

Magnetic Resonance Imaging (MRI)/Ultrasound…..……..……..734-936-4500

CT SCAN……...……..……734-936-4566 (option 2)

Ambulatory Cardiac Monitoring (ACT)……...1-800-418-4111

Vascular lab……..……..……..734-936-5937

Therapies Physical, Occupational &Speech and Language Pathology

To schedule an appointment, call the University Hospital number for assistance in scheduling at the most appropriate place.

University Hospital……..……..……734-936-7070

Canton Health Center…..……..734-844-2020

MedRehab (Briarwood Health Center) ……...……...…..…….734-998-7888

Northville Health Center ……248-305-4400

Burlington Clinic …….....734-763-6464

Brighton Health Center……810-225-8677

MedSport ……..……734-930-7400

Northville Health Center…….……248-305-4400

Other

Michigan Visiting Nurses ……...……866-914-1453

Depression Center 800-525-5188

Tobacco Consultation Services 734-938-6222

Michigan Quit Line (Smoking)…….....800-784-8669

Patient Portal:

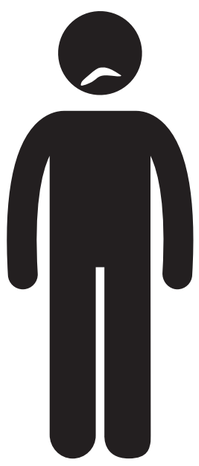
MyUofMHealth.org is a secure way to manage your health online, offering access to important health information. With the portal you can team, request and prescription refills, pay your bill, and more.

- E-mail HIM-PatientPortal@med.umich.edu(link sends e-mail), or
- Call our Health Information Management Department at (734) 615-0872

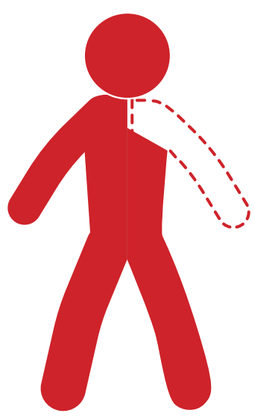
American Stroke Association®
A division of the American Heart Association.
Together to End Stroke®

SPOT A STROKE™

F.A.S.T.



FACE Drooping



ARM Weakness

SPEECH Difficulty

TIME to Call 911

Learn more at **stroke.org**

Stroke Basics

What is a stroke?

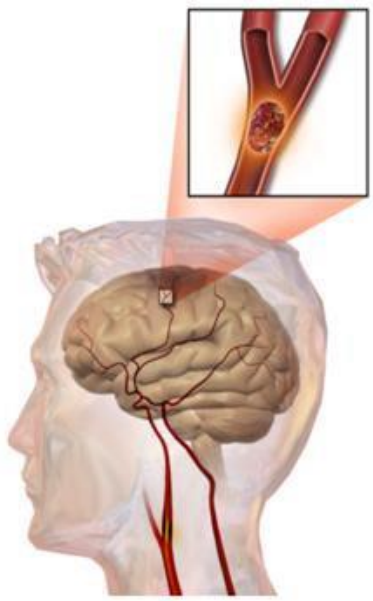
A **stroke** occurs when blood supply to the brain is suddenly reduced or a blood vessel bursts. A stroke prevents brain tissue from getting the oxygen and nutrients that the brain needs to survive. When a stroke occurs, brain cells begin to die within minutes.

There are two different types of stroke:

- **Ischemic** stroke (non-bleeding)
  - **Transient Ischemic Attack (TIA)**
- **Hemorrhagic** stroke (bleeding)

What is an Ischemic stroke and Transient Ischemic Attack (TIA)?

Ischemic stroke occurs when the arteries to your brain become narrowed or blocked. This causes reduced blood flow and oxygen to the brain tissue leading to permanent brain tissue injury. **Transient ischemic attack (TIA)** is caused by a temporary decrease in blood flow and oxygen to your brain. TIAs do not cause long-term neurological impairment



"Blausen 0836 Stroke" by Blausen Medical Communications, Inc. Licensed under CC BY 3.0 via Wikimedia Commons.

(neurological symptoms) or permanent brain tissue injury.

What causes ischemic stroke and TIA?

- Long-standing high blood pressure: This is called **small vessel (or lacunar) stroke**.
- Plaque or cholesterol buildup which can narrow or block arteries in the brain or neck: this is called **Atheroembolic or atherosclerotic stroke.**
- A blood clot travels from your heart to your brain, blocking blood flow: this is called a **cardioembolic stroke.** A common cause of cardioembolic stroke is atrial fibrillation.
- Unknown case: This is called an **idiopathic/cryptogenic stroke**, occurring in about 1 out of 3 of people who experience an ischemic stroke.
- Other (endocarditis, dissection, drugs of abuse)

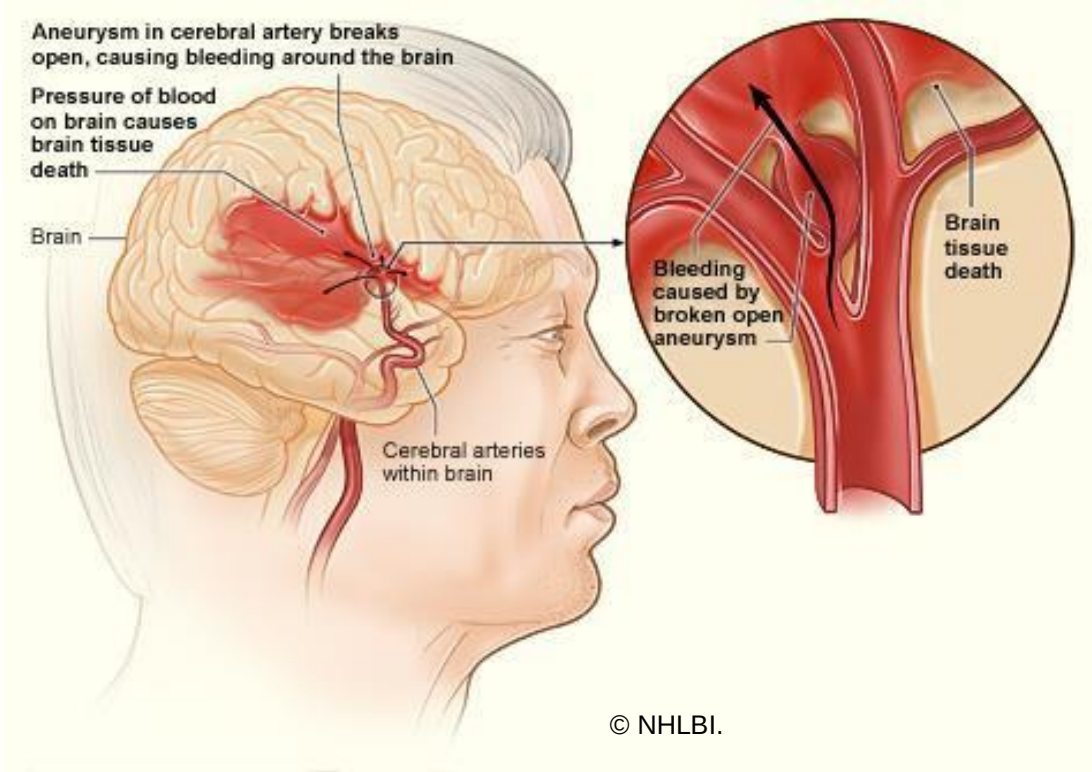
What is a hemorrhagic stroke?

Hemorrhagic strokes occur when a blood vessel bursts causing bleeding inside of the brain.

There are two types of hemorrhagic stroke:

1. **Intraparenchymal** (in·tra·pa·ren·chy·mal) **hemorrhage** occurs when ablood vessel in the brain bursts. Intraparenchymal hemorrhages are often related to high blood pressure or trauma to the head.

2. **Subarachnoid** (sub·arach·noid) **hemorrhage** occurs when a blood vessel bursts within the **subarachnoid space**, which is the area between your brain and the tissues that cover it. Subarachnoid hemorrhages are often related to aneurysms (bulging due to weak blood vessel) or trauma to the head.



What are the effects of stroke?

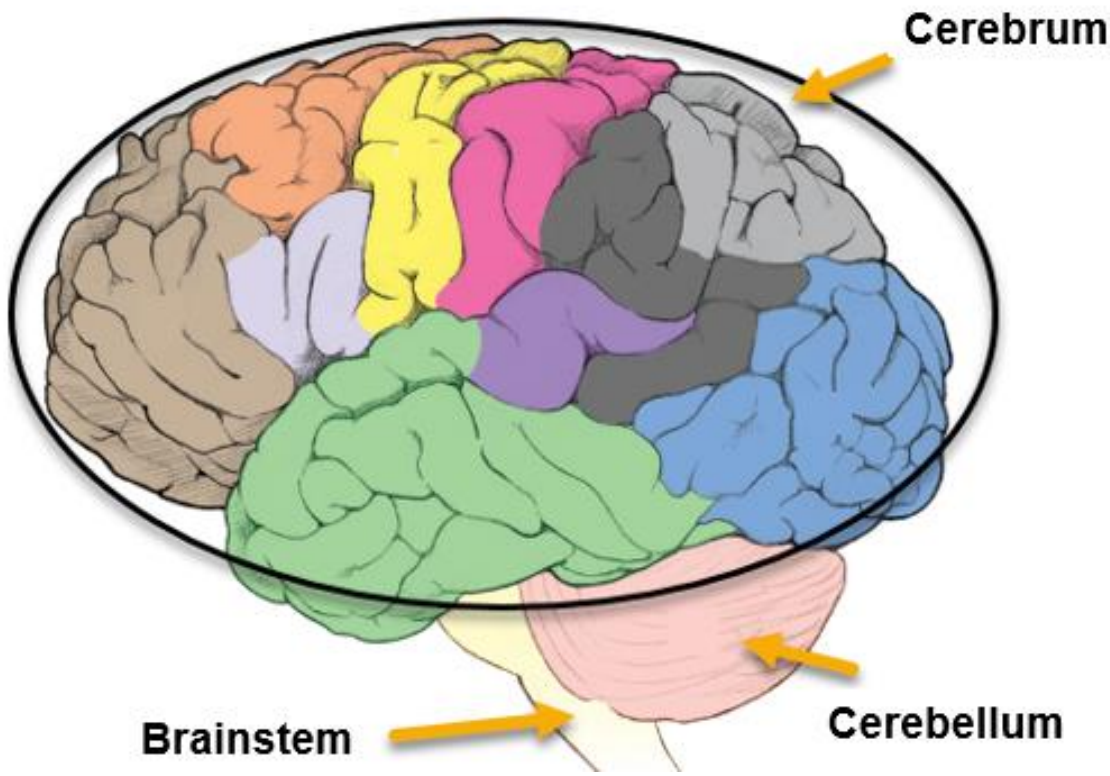
The effects of stroke vary from person to person and are based on the location and size of the stroke, as well as the person's baseline level of function. Each part of the brain is responsible for a specific function. When a specific area of the brain is damaged, the normal function of that area may become impaired.

Main Parts of the Brain and their Function

The brain is divided into three different sections:

- Cerebrum (right and left side)
- Cerebellum
- Brainstem

Three Main Functional Areas of the Brain



The Cerebrum

The language function (or ability to understand language or communicate) is located in your left hemisphere. Memory changes can occur from damage to either side of the cerebrum.

- Effects of a **right hemispheric stroke** can include sudden**:**
  - Left-sided weakness or paralysis and sensory changes
  - Gaze preference to the right
  - Left-sided neglect or lack of awareness of the left side of the person's space or body
  - Difficulty with directions or depth perception
  - Loss of the left visual field in both eyes

    - Difficulty with speech (how words sound)
- Effects of a **left hemispheric stroke** can include sudden:
    - Right-sided weakness or paralysis and sensory changes
    - Gaze preference to the left
    - Problems understanding verbal and written language
    - Loss of the right visual field in both eyes
    - Difficulty with speech (how words sound)

- Please see the image at the end of this chapter for an illustration of the functional areas of the cerebral cortex. This image can help you understand what functions the different parts of the brain control.

The Cerebellum

- Effects of a **cerebellar stroke** can include sudden:
    - Dizziness
    - Imbalance and problems with coordination
    - Difficulty with speech (how words sound)
    - Nausea, vomiting

The Brainstem

The brainstem is the body's vital support and controls functions such as blood pressure, breathing, and heartbeat. The brainstem also controls eye movement, speech, and swallowing. As with cerebral strokes, brainstem strokes can cause left- or right-sided weakness or numbness.

- Effects of a **brainstem stroke** can include sudden:
    - Impaired swallowing
    - Difficulty with speech (how words sound)
    - Double vision
    - Imbalance and problems with coordination
    - Trouble walking

- Weakness or paralysis, usually on one side of the body
- Numbness, usually on one side of the body

FUNCTIONAL AREAS OF THE CEREBRAL CORTEX

1 Higher Mental Functions
- Concentration
- Planning
- Judgment
- Emotional expression
- Creativity
- Inhibition - Ability to control self

2 Motor Function Area
- Eye movement and placement of eyes

3 Broca's Area
- Ability to talk
- Ability to write

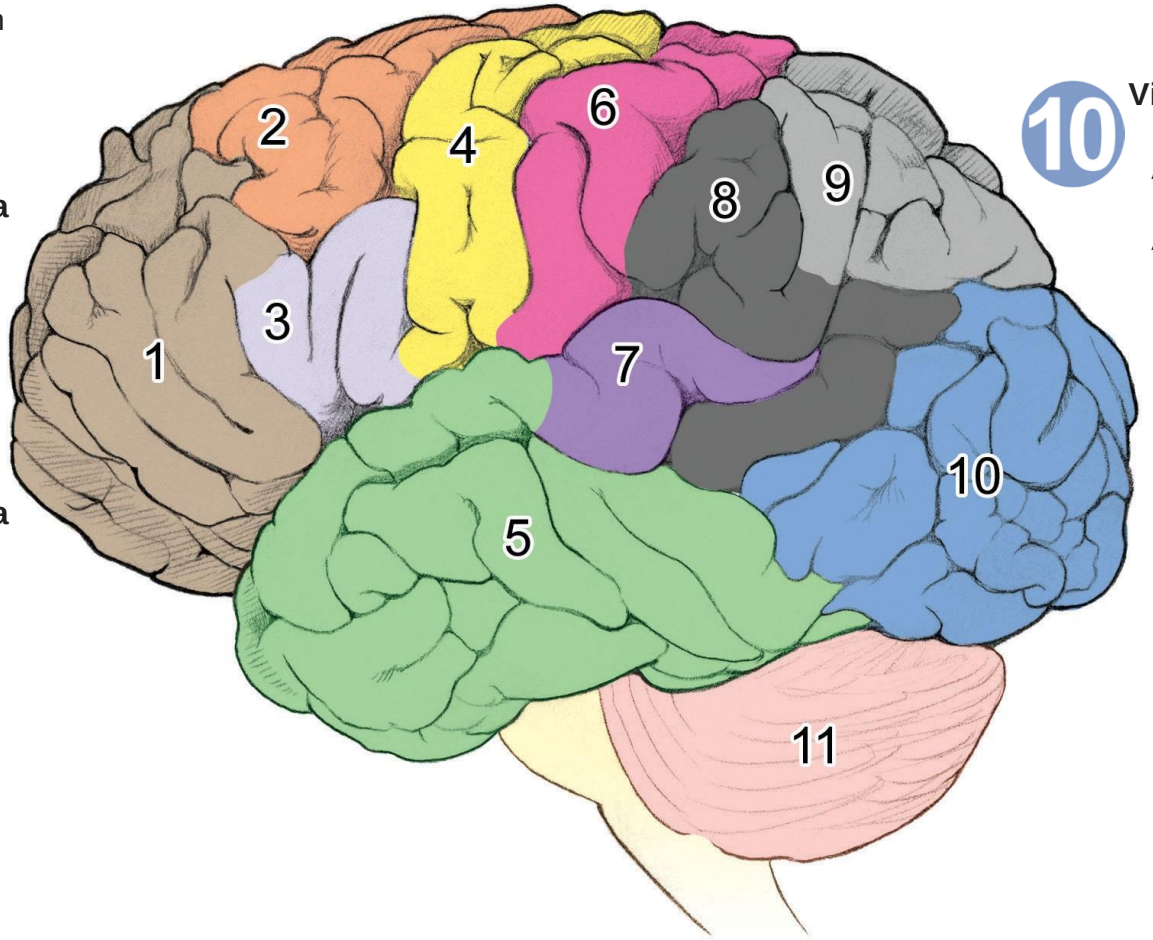
4 Motor Function Area
- Ability to move muscles

5 Association Area
- Short-term memory
- Emotion

6 Sensory Area
- Touching and feeling

7 Auditory Area
- Hearing

8 Wernicke's Area
- Written and spoken language understanding



9 Somatosensory Association Area
- Understanding of weight, texture, temperature, etc. for recognizing and comprehending an object

10 Visual Areas
- Sight
- Ability to recognize pictures
- Awareness of size and shape

FUNCTIONAL AREAS OF THE CEREBELLUM

11 Motor Functions
- Coordination of movement
- Balance
- Posture

Treatments and Procedures Immediately After a Stroke

Treatment for a stroke depends on whether it is an ischemic stroke or a hemorrhagic stroke, how long it has been since the stroke symptoms started, and many other factors specific to you. Your doctors will select the best treatment for you depending on these factors.

The time immediately after the start of your stroke symptoms is known as the **acute period**. Your healthcare team will be working quickly to figure out what treatment is best for you during this period. This can be a scary and fast-paced time.

After you have received acute treatment for your stroke, you should expect to be monitored closely by your healthcare team. You will likely be admitted to either the Stroke Unit or the Neurological Intensive Care Unit.

What are the treatments for Ischemic Stroke during the acute period?

An **ischemic stroke** occurs when there is a blockage or reduction in the flow of blood to the brain. If the body cannot clear this blockage, then permanent brain

damage (infarction) will result within minutes to hours. Therefore, the goal of acute stroke treatment is resolving this blockage **as soon as possible**.

There are treatments available in the immediate (acute) period of stroke symptom onset. Since they are only available within a certain timeframe, it is important **to call 911 and go to the hospital as soon as you notice symptoms**. **These treatments can save lives and reduce long-term effects of stroke.**

IV tPA

Alteplase or intravenous (IV) tissue plasminogen activator (tPA), is a clot-busting medication that can be administered through an IV. IV tPA can help dissolve blood clots and improve blood flow to the part of the brain that is being deprived of blood flow. This medication is infused through an IV over a period of an hour.

If eligible, you can receive IV tPA within 3 hours of the **last known normal.** Some people can receive it within 4.5 hours of last known normal. Unfortunately, many people do not arrive at the hospital in time to receive this medication, so it is important to seek treatment immediately if you think you are having a stroke.

Last known normal is the date and time at which you were last known to be without the signs and symptoms of current stroke or at your previous neurological baseline.

What can I expect during and after receiving IV tPA?

Once the tPA infusion starts, your healthcare team will pay close attention to your neurological (brain) functioning. They will complete a neurological assessment every 15 minutes during the hour-long infusion. They will also

regularly monitor your **vital signs** (blood pressure, heart rate, and breathing rate).

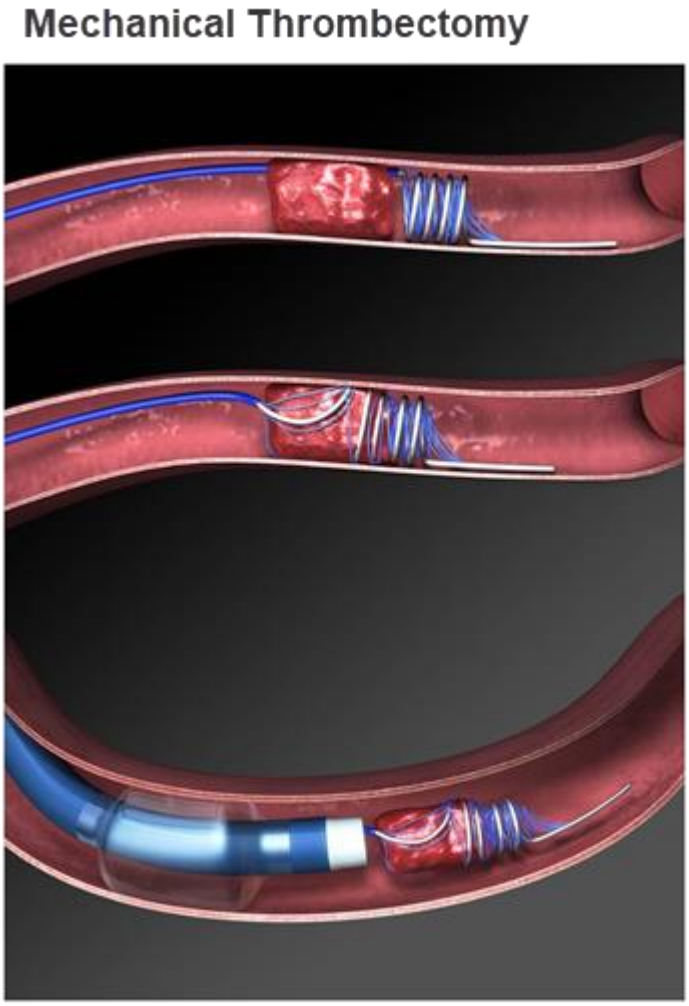
After tPA is given, your team will continue to monitor your neurological functioning and vital signs frequently over the next 24 hours.

Mechanical Thrombectomy

A mechanical thrombectomy uses a catheter (tube) to mechanically remove a clot from a vessel in your brain.

For this procedure, you may receive a medicine to help you feel drowsy and relaxed. Depending on the situation, some people may require heavier sedation which may mean a temporary breathing tube is placed (intubation) for the procedure.

During the procedure, a catheter is threaded through an artery in the groin up to the blocked artery in the brain. A wire-cage device, called a **stent retriever**, is then put through the catheter up to the blocked artery. The stent will open and grab the clot to remove it. Occasionally, a special suction tube is also used to help with removal. After clot removal, the entire device is removed from the artery.



This procedure can take place up to 24 hours after last known normal. You will also likely be treated with IV tPA if you are eligible.

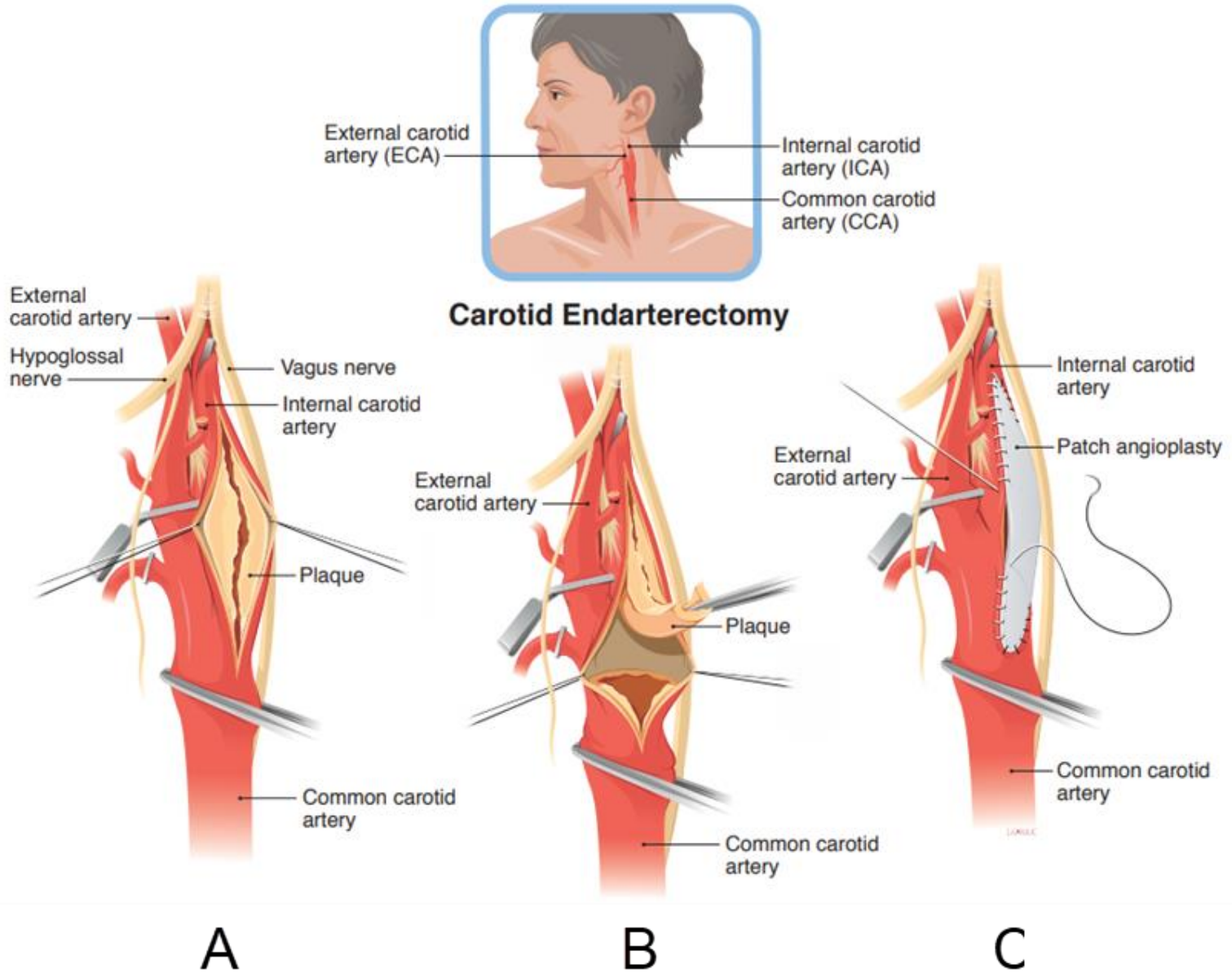
What can I expect after mechanical thrombectomy?

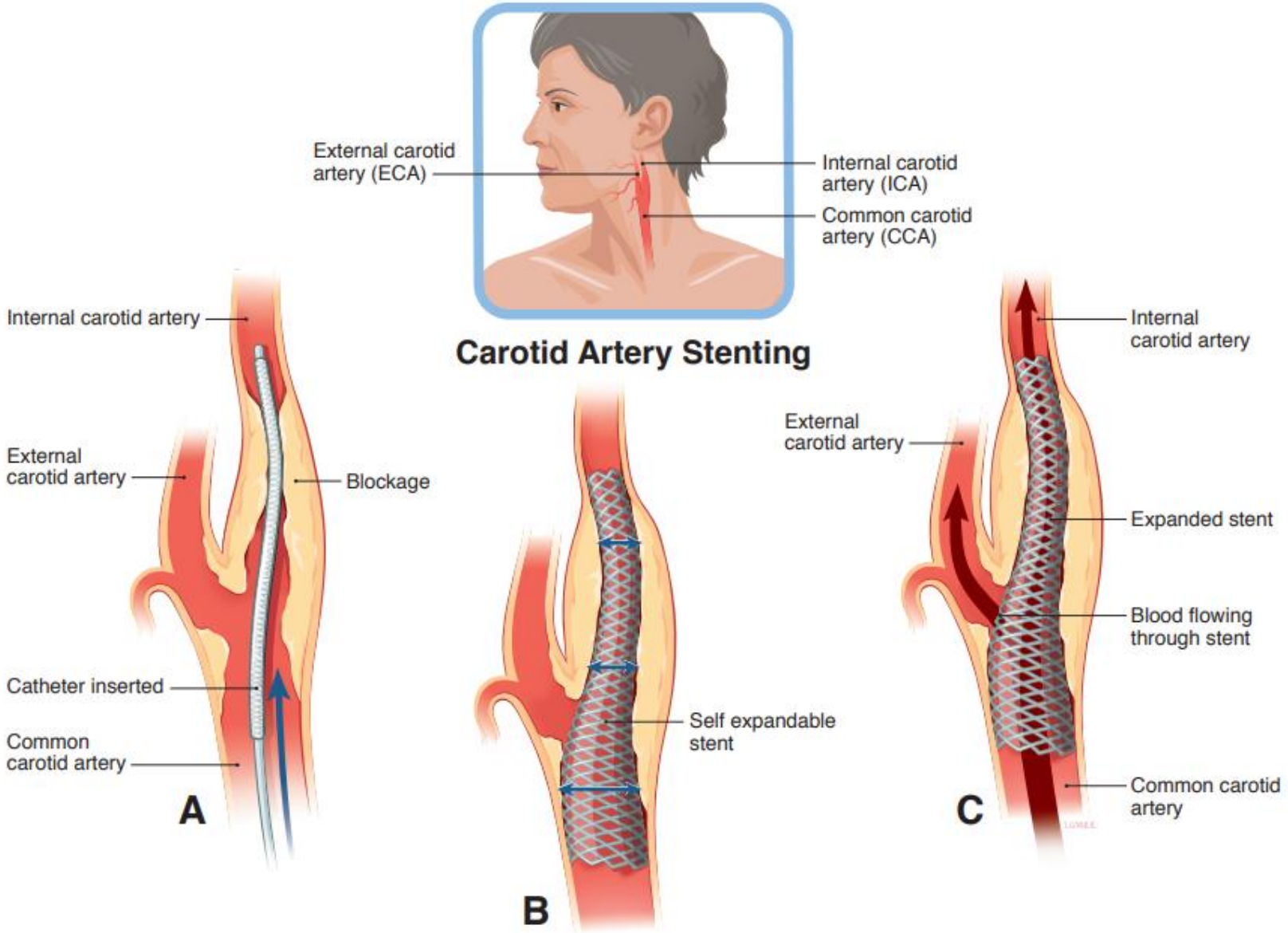
After the procedure, you will spend some time in a recovery room and then be transferred to a stroke unit or intensive care unit for further monitoring. Your healthcare team will pay close attention to your neurological functioning and monitor your vital signs (blood pressure, heart rate, and breathing rate) frequently. You will need to stay in the hospital for a day or more, depending on your condition.

What procedures are performed in the hospital to prevent me from having ischemic stroke?

For those with **carotid artery stenosis** (narrowing), there are surgical procedures that aim to help prevent a first ischemic stroke or a repeated ischemic stroke. Your doctors will take careful consideration to determine your eligibility for these procedures:

- **Carotid endarterectomy (CEA):** Your surgeon makes a cut in your neck to reach the narrowed or blocked artery. They will open the blocked part of the artery and remove the plaque that is blocking blood flow. (see page 5)
- **Carotid artery angioplasty and stenting (CAS):** is used to widen the carotid artery and restore normal blood flow. A thin tube with a deflated balloon on the end is threaded through a blood vessel in your neck to the blocked artery. Once in place, the balloon is inflated to push the plaque against the artery wall and small wire mesh coil (stent) is then put into the artery to keep the artery open. (see page 6)


External carotid artery (ECA)
Internal carotid artery (ICA)
Common carotid artery (CCA)
Carotid Endarterectomy
External carotid artery
Hypoglossal nerve
Vagus nerve
Internal carotid artery
Plaque
Common carotid artery
External carotid artery
Plaque
Common carotid artery
Internal carotid artery
Patch angioplasty
External carotid artery
Common carotid artery
A
B
C


External carotid artery (ECA)
Internal carotid artery (ICA)
Common carotid artery (CCA)
Carotid Artery Stenting
Internal carotid artery
External carotid artery
Blockage
Catheter inserted
Common carotid artery
A
Self expandable stent
B
External carotid artery
Internal carotid artery
Expanded stent
Blood flowing through stent
Common carotid artery
C

What procedures are performed in the hospital to prevent me from having hemorrhagic stroke?

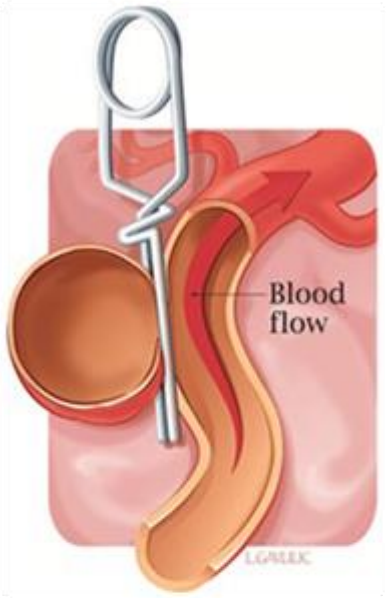
Clipping: A surgery for treatment of a brain aneurysm. A surgical clip is placed at the bottom of the aneurysm to stop blood flow into the aneurysm and reduce the risk of rupture (burst).

Coiling: A catheter fills the aneurysm with detachable coils to reduce the risk of rupture.

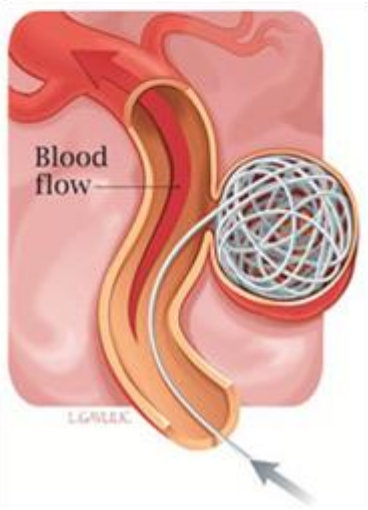
Craniotomy: A surgical opening in the skull to access the brain for surgery, such as clipping of an aneurysm. This piece of skull is returned to its original position at the end of surgery.

Craniectomy: A procedure that removes a larger section of the skull to reduce pressure in the head. With this method, the bone plate is left off for an extended period to allow for reduced swelling.

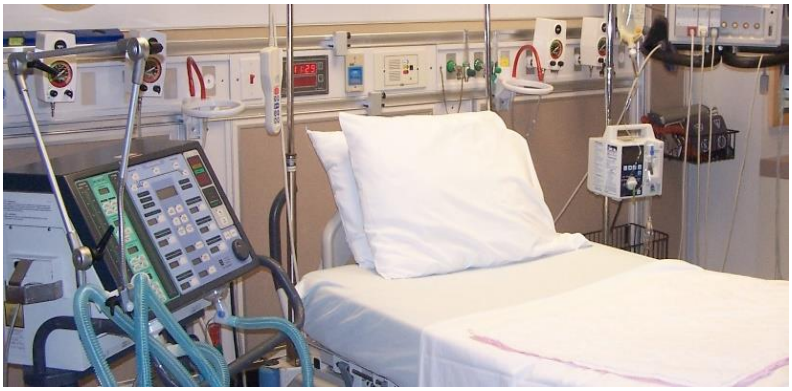
Clipping:



Coiling:



Your Hospital Stay



Tips for a safe hospital stay

Who can I call if I have immediate concerns about my care?

Immediately contact your nurse. If you can't reach your nurse, or still have concerns about the approach to the care of your loved one, then you contact **F.I.R.S.T.**:

Pick up a **hospital phone** and:

Dial 141 to reach F.I.R.S.T. (Family Initiated Rapid Safety Team)

Available 24 hours a day, 7 days a week

This phone number connects you to a team that provides immediate assistance within minutes.

Please also review the following safety tips to help you have a safe hospital stay:

- **Speak up.**
  Speak up if you have any questions or concerns. You have the right to question anyone who is involved with your care.
- **Know who's in charge of your care.**
  Many people may be involved in your care. Also, doctors can

change during your stay. You can encourage your care providers to write their names and roles on the whiteboard in your inpatient room so you can better understand who is on your care team.

- **Ask your doctor about your test results.**
  Do not assume "no news means good news."
- **Be informed about any procedures.**
  Make sure you and your doctors all agree on exactly what procedures will be done.
- **Have an advocate.**
  When you are unable to speak up (because you are sedated or have a breathing tube that prevents you from speaking), a trusted family member or friend can be your advocate.

Identification bracelet

When you arrive, an ID band with your name and medical record number (MRN) is put on your wrist. Staff will check your identity by looking at this ID bracelet. **Please do not remove the bracelet until after you are discharged home.**

What can I do to prevent falls?

All stroke patients in the hospital have an increased risk of falling. Fall **risk factors** are things that can make you more likely to fall while in the hospital. Some of these factors that can make it difficult to move safely on your own include:

- Effects of medications
- Side effects from the stroke
- New surroundings
- Pain

- Being attached to tubes and wires

Follow the ABC's of fall prevention:

- **A**sk for help: Call the nurse or nurse aide if you want to get up.
- **B**e aware of your body: Do you feel dizzy or weak?
- **C**aution: Is there enough light? Are you wearing slip-resistant socks or shoes?
- **D**anger: Do not use unsteady items such as bedside table or IV pole to get up.

Hand Hygiene

People in the hospital can get infections called **healthcare-associated infections**. These are infections that patients get while receiving medical care for another condition.

What can I do to protect myself from healthcare-associated infections?

- Clean your hands with soap and water or use alcohol-based hand sanitizer frequently
- Remind your visitors to clean their hands with soap and water or use alcohol-based hand sanitizer when they enter and leave your room.
- Make sure your health care providers wash their hands with soap and water or use alcohol-based hand sanitizer when they:
    - Enter and leave your room
    - Before and after they care for you

  If you do not see your healthcare providers clean their hands, ask them to do so. "Would you please clean your hands again in front of me?"

Medication safety

While in the hospital you can expect staff to give you the right medications. Your doctor may also order new medications when you are in the hospital. Please speak up if you feel that any medication you receive is not right. Be familiar with your medications, be sure you know:

- The medication you are taking and why you are taking it
- What the medication looks like
- The dose (amount)
- How often you take the medication and what time of day
- What side effects may occur

Who is on my care team?

Our stroke team is dedicated to providing you with the best personalized care. The team includes staff with many different skills who work together to help you. Below is a list of the members on your care team. Feel free to ask any question to anyone on your team.

A care team "makes rounds" by visiting all their patients at the bedside.

Specific members of your care team and their roles are listed in the table below.

Type of specialist:	Responsibilities:
Attending Physician	Doctors who lead the stroke team. They decide on testing, treatment, and how you can prevent future strokes.
Cardiologists	Doctors who specialize in taking care of the heart. They determine if you have any heart problems that may have caused your stroke.
Care Managers	Registered Nurses who partner with you, your family, and the medical team to improve the coordination of care during your hospital stay and ensure a safe discharge.
Clinical Psychologist	Specialists who provide continued and complete emotional and behavioral healthcare for you and your family.
Consulting Physicians	Doctors who specialize in a specific area related to your medical condition and advise on your care.
Dieticians	Providers that create a diet plan to fit your needs.
Neuro-Intensivist	Doctor who specializes in Intensive Care Unit (ICU) procedures and care.
Neuro-Interventional Radiologist	Doctors that use scanning imagery to guide them while accessing vessels and organs or organ structures.
Neurologists	Doctors who specialize in neurology (the central nervous system) and treat disorders that affect the brain, spinal cord, and nerves.
Neuroradiologist	Doctors that specialize in the use of radioactive substances, x-rays and scanning devices to diagnose and treat diseases of the nervous system.

Neurosurgeon	Doctors who specialize in diagnosing and surgically treating the nervous system and brain.
Nurses	Members of your care team that assess, monitor, and care for you during your hospital stay. They advocate for your care with all team members. The nurses will teach you how to care for yourself and how to prevent another stroke.
Nurse Practitioners (NP)	Nurses who are trained and qualified to examine, diagnose, and treat certain medical conditions. They discharge patients under the supervision of the doctor.
Occupational Therapists (OT)	Therapists that provide a holistic approach (mind, body, spirit, and emotion) to help people reach the greatest level of function (activities of daily living) and independence. Their goal is to help you achieve the best result for health improvement during stroke recovery.
Physicians Assistants (PA)	Providers that practice medicine on teams with doctors, surgeons, and other healthcare workers. They examine, diagnose, treat certain medical conditions, and discharge patients under the supervision of the doctor.
Physical Medicine and Rehabilitation (PM&R)	Doctors dedicated to enhancing and restoring functional ability and the quality of life to those with physical weakening or disabilities after a stroke.

Physical Therapists (PT)	Therapists who are trained in all aspects of anatomy and physiology related to normal function, with an emphasis on movement. They help stroke survivors regain strength, coordination, balance, and control of movement including walking, climbing stairs, and getting into and out of bed.
Rehabilitation Psychologists	Specialists in clinical psychology that focus on applying their knowledge of psychology to people who have an injury or illness. They assess and treat cognitive, emotional, and functional difficulties, and help people overcome barriers to participate in life activities.
Resident Physicians	Doctors who practice medicine under the supervision of an attending doctor. They often help monitor and communicate with the attending doctor and other disciplines.
Social Workers	Specialists who support patients, care givers and families in managing the response to your illness or treatment, financial and emotional issues and grieving.
Speech-Language Pathologists	Therapists who assess and treat communication and swallowing disorders after stroke.
Stroke Fellow (doctor)	A doctor extending their training in the area of stroke.
Techs and Nurse Assistants	Specially trained assistants who provide care in many ways, for example taking vital signs, documenting your information, taking care of your hygiene and toileting needs, and giving important feedback to nurses.

Unit Hosts	Specially trained staff who support the nursing staff and facilitate the daily operations of the unit, such as gathering medical supplies and equipment. They help keep the unit organized and provide guest services.

What is Care Management?

Care Management is part of your Care Team. It is led by a Registered Nurse (RN) case-manager and a social worker. They will partner with you, your family, your doctor, bedside nurse and other care providers to improve the coordination of your hospital stay (or that of a loved one) and to prepare a safe discharge. Care Management will begin working on your transition for a safe discharge as soon as you are admitted to the hospital.

Please share your concerns and questions with Care Management. It is important to remember that the team is not complete without your voice!

What services does Care Management help put together before and after I leave the hospital?

Care Management works to connect you with services and agencies that can support you or your loved one during the hospital-stay and after discharge.

Their duties include:

- Working with your insurance carrier to coordinate your benefits and obtaining authorizations for your hospital stay
- Counseling related to how illness, disability, and grief can impact you and your family
- Problem-solving with you on social and financial barriers that

impact your medical care

- Providing community resources information and referrals
- Connecting you with the following services as needed:
    - Hospice
    - Home care services such as:
        - Visiting nursing
        - Physical therapy
        - Occupational therapy
        - Speech therapy
        - Private duty nursing
        - Out of hospital placement referrals including skilled nursing facilities and acute rehab facilities
        - Infusions at home (IV's and tube feeding) after discharge
        - Durable medical equipment (wheelchairs, oxygen, medical supplies)

If you have questions or concerns that are not listed here, Care Management can connect you with the appropriate resource to get you the answers you need.

Equipment you may see in the hospital

When you are in the hospital, it's normal to have tubes and wires attached to your body. They help the staff check your vital signs, take blood, give medications and provide nutrients. The following is a brief description of some of these tubes and what you and your family can expect.

Arterial Line (art line or a-line)	A thin tube (catheter) inserted into an artery to monitor blood pressure and obtain blood for lab tests.
Heart Monitor	A device that continually monitors heart activity and heart rhythm.
Central Line	An IV placed into a large vein in the neck, chest or sometimes in between the legs (groin).
Dobhoff Tube	A small flexible tube that is passed through the nose and into the stomach. It is used for giving medication or nutrition when swallowing is a problem. It is smaller and more comfortable than the Nasogastric Tube.
Feeding Tube, Percutaneous Endoscopic Gastrostomy (PEG) or G-Tube	A tube that's placed into your stomach through your abdomen. It's used to supply nutrition when you have trouble eating.
Nasogastric Tube (NG)	A narrow tube that is passed through the nose and into the stomach for medication, nutrition or to rest the stomach.
PICC (Peripherally Inserted Central Catheter)	A type of central line that carries fluid and medicine into the body through a vein in the upper arm.
Sequential Compression Device (SCD)	Sleeves wrapped around the legs that inflate and deflate with air to improve blood flow in the legs to prevent a blood clot.

Ventilator	A machine that moves air in and out of the lungs to assist you if you need extra support, or you are unable to breathe on your own.
Ventriculostomy	A device that is placed in the ventricle of the brain to drain fluid and measure pressure in the brain. The brain ventricles are a set of 4 connected cavities that produce special fluid that acts as a cushion or buffer for the brain.

Recovering After Your Stroke

When you have a stroke, part of your brain becomes damaged. Scientists used to think that when a part of the brain was damaged, there was no way to recover what was lost. However, it has been found that this is not the case. The brain can adapt and form new networks to help restore function, even after stroke. This ability is called **neuroplasticity**.

> **Neuroplasticity:** The ability of the brain to form and reorganize synaptic connections, especially in response to learning or injury

While you are in the hospital after a stroke, depending on your symptoms, you may meet with a physical therapist, occupational therapist, speech language pathologist, or possibly a physical medicine and rehabilitation doctor. These healthcare providers will be your rehabilitation team. This team will evaluate your overall function and create a therapy plan to help you with your recovery. **The best way to restore and maintain function is by repeating the activities outlined in this therapy plan often.**

Physical Therapy	Therapy to help improve movement and restore physical function. Physical therapists help you regain strength, coordination, balance, and the ability to walk.

Occupational Therapy	Therapy to help adapt and increase your independence in activities of daily living. This may include activities like dressing, bathing, brushing teeth, and writing.
Speech Language Pathology	Therapy to prevent, assess, diagnose, and treat speech, language, communication, and swallowing disorders.
Physical Medicine and Rehabilitation (PM&R)	Doctors dedicated to enhancing and restoring physical function and quality of life.

After your initial therapy treatments in the hospital setting, your rehabilitation team will help you choose the right setting to go to after discharge from the hospital and will help decide whether you need to continue with therapy. This is discussed more in the next chapter.

Common complications after stroke

If you have had a stroke, you may be at risk of having other medical problems or complications. In the days and weeks following a stroke, there are some things you can do to decrease your risk of some of these complications.

Common complications after a stroke include:

- Falls
- Depression
- Fatigue (tiredness)
- Seizure
- Spasticity
- Pneumonia
- Deep vein thrombosis (DVT)

- Urinary incontinence (losing control of your bladder)

Falls

Falls are one of the most common complications after stroke. Falls can lead to both minor and serious injuries including bruising, cuts, head injuries, and bone fractures. Patients who have had a stroke are often on medications to keep blood clots from forming (often referred to as "blood-thinners"). These medications can make falling more dangerous because they cause you to bleed and bruise more easily. We will work with you to set up a plan to reduce your risk of falling.

The ABC's of fall prevention

- **A**sk for help: Call the nurse or nurse aide if you want to get up.
- **B**e aware of your body: Do you feel dizzy or weak?
- **C**aution: Is there enough light? Are you wearing slip-resistant socks or shoes?
- **D**anger: Do not use unsteady items such as bedside table or IV pole to get up.

The video at the link below explains what you and your caregiver can do to prevent falls.

- https://tinyurl.com/6v84sypt

Depression

Depression affects at least one-third of stroke patients. Depression can occur anytime during your stroke recovery, including during the days or months after your stroke. Stroke survivors and their families will often ignore symptoms of depression because they think it is "normal" to feel

sad or down after a stroke. Depression can cause stroke survivors to lose interest in their usual activities and can impact the ability to concentrate and take part in their rehabilitation programs. This can slow the recovery process.

What are the symptoms of depression?

- Depressed mood
- Loss of interest or pleasure in formerly pleasurable activities
- Change in appetite or weight
- Not being able to sleep (insomnia) or sleeping too much
- Fatigue or loss of energy
- Irritability
- Thoughts of self-harm or actual self-harm

If you experience any of these symptoms, contact your primary care doctor for help and support. Social workers can also help you cope with your emotions. You can call the **Guest Assistance Program** at **(800) 888-9825** to request social work services. It is best to get treatment early to prevent worsening symptoms.

If you or someone you know is having thoughts of harming themselves, tell your healthcare provider immediately. If you have strong thoughts of suicide or a suicide plan, go to an emergency room right away or call one of the following:

- **911**
- **The 24-hour Suicide & Crisis Lifeline at 988**

Post-stroke fatigue (tiredness)

Everyone feels tired sometimes, but this usually happens after a very busy day or from not getting enough sleep. Post-stroke fatigue is the tiredness you feel after a stroke. It is different from regular fatigue and is considered one of the most common side effects of stroke, occurring in almost one-third of stroke patients. You may feel a lack of energy or strength and feel constantly tired. Post-stroke fatigue does not always get better with rest and is not necessarily related to how busy or active you have been.

What are the symptoms of post-stroke fatigue?

- Feeling tired, even after a good night's sleep
- Feeling like your symptoms never seem to get better
- Feeling easily tired when you perform a task requiring physical or mental focus
- Experiencing fatigue that occurs without warning and makes it harder to do routine daily activities as well as social or work activities

What factors can affect my level of fatigue after a stroke?

Post-stroke fatigue can be present even when all other contributing factors are controlled. However, some factors can increase post-stroke fatigue, including:

- **Depression**: Untreated depression can lead to an increase in fatigue.
- **Untreated sleep apnea**
- **Medications**: Some medications may make you more tired than usual.
- **Post-stroke effects**: Physical symptoms such as limb weakness can mean movements and activities of daily living require more energy than they used to.
- **Pain**: Pain requires energy to cope and often increases fatigue.

- Other untreated medical problems including **hypothyroidism** (underactive thyroid) and **anemia** (not having enough health red blood cells).

How can I manage post-stroke fatigue?

- Treat medical conditions such as obstructive sleep apnea, depression, pain, anemia, and hypothyroidism.
- Practice good sleeping habits and work with your doctor to get a full night's rest.
- Rest when you need to and try to rest before getting too tired or over-fatigued. Listen to what your body is telling you.
- Balance rest with an adequate amount of activity.
    - Start small and slowly increase the number of tasks you do each day.
- Prioritize your daily activities and eliminate unnecessary tasks.
- Talk to your speech language pathologist or occupational therapist about the "Spoon Theory."

Seizure

Having a stroke can increase your risk of having a seizure. Stroke causes injury to the brain which can change the brain's electrical activity; the change in electrical activity can cause a seizure. Certain types of strokes are more likely to cause a seizure. These include venous strokes, large-sized strokes, and strokes located within the **cerebral cortex**, or outer layer of the brain.

What does a seizure look like?

Seizure can present in many ways and can go unnoticed by the person having the seizure. Be sure that you and your support system are aware of common seizure symptoms.

Seizure symptoms can include:

- Shaking or twitching movements (can include just one arm or only part of the face)
- Staring blankly and not responding
- Sudden loss of consciousness, followed by getting stiff, and then having jerking movements (typically called “grand mal” or “tonic-clonic” seizure)

What do I do if I observe someone having a “grand mal” or “tonic-clonic” seizure?

- Call 911.
- Note the time the seizure started.
- Roll the person onto their side, cushion their head, and loosen collars.
- Do not put anything in their mouth, even medicine or water.
- Do not move them unless the immediate area is unsafe.
- Stay with them until the seizure ends or emergency response has arrived.

Pneumonia

What is pneumonia?

Pneumonia is an infection in the lungs that can cause coughing, fever, and trouble breathing. It is a common complication in the first few weeks following a stroke.

What are the symptoms of pneumonia?

Common symptoms include:

- Cough
- Fever
- Trouble breathing
- Pain when you take a deep breath
- Chills

What causes pneumonia?

The primary cause of pneumonia after stroke is **aspiration**. Aspiration occurs when food, liquid, saliva, or vomit are breathed into the airways, instead of being swallowed into the esophagus and stomach. Some stroke patients have **dysphagia**, or difficulty swallowing, after their stroke. This can increase your risk of aspiration.

How do you prevent pneumonia?

When you first come to the hospital, you will not be given anything by mouth until a **swallow screen** is completed. For this, your nurse will follow a few simple steps to evaluate your swallowing. If we have any concerns, we will refer you to **Speech Language Pathology** for additional evaluation and treatment.

Other ways to prevent pneumonia:

- Quit smoking.
- Walk as soon as you safely can.
- If you cannot walk, ask your nurse or doctor if you can use an **incentive spirometer** (a device that helps exercise and strengthen your lungs).
- Eat and drink with the head of the bed raised up to prevent aspiration.

Deep vein thrombosis (DVT)

What is a DVT?

Deep vein thrombosis (DVT) is a condition in which a blood clot **(thrombus)** forms in a deep vein inside the body. This most commonly occurs in the lower leg or thigh.

What are the symptoms of a DVT?

Only about half of people who have DVT will have signs and symptoms. Common symptoms include:

- Swelling of the leg
- Pain or tenderness in the leg
- Red or discolored skin on the leg
- Increased warmth along the leg

What causes a DVT?

Anything that prevents your blood from flowing or clotting normally can cause a DVT. This includes not moving enough while lying in bed or decreased movement of an extremity after stroke.

How do you prevent a DVT?

- Walk as soon as you can safely.
- If you cannot walk, exercise while you are in bed. If you can, try pointing your toes toward the bottom of the bed, then up toward your face. Repeat 10 times each hour you are awake.
- We may give you certain blood thinning medications (Lovenox or heparin) while you are in the hospital to help prevent a DVT.
- We may place an inflatable device called **sequential compression devices** (SCDs) on your legs to help prevent a DVT.

Spasticity

What is spasticity?

Spasticity is the uncontrolled tightening or contracting of muscles on the side of your body affected by the stroke. This occurs when the part of your brain affected by the stroke can't control muscle movement.

Spasticity can cause pain and decreased mobility which can interfere with your daily functioning and sleeping. There are some benefits to spasticity, including increase in leg tone which can help with some activities, such as standing.

What are the symptoms of spasticity?

- Increased muscle tone
- Muscle spasms
- Rapid muscle contractions
- Contractures (loss of movement of the joint)

How do I prevent spasticity?

You can prevent spasticity through regular muscle stretching, range of motion exercises, and frequently moving the parts of your body that are affected. **Occupational** and **physical therapists** can assist you with these types of exercises.

Talk to your doctor if you notice symptoms of spasticity to discuss treatment options.

Urinary incontinence (losing control of your bladder)

What is incontinence?

The term continence is used when you have control of your bowel or bladder. **Urinary incontinence** is when you have poor bladder control. This is common after stroke. Your stroke may have affected the part of your brain that helps you control urination. This can lead to urinary urgency and frequency.

There are certain things you can do to help you cope with incontinence as you recover at home:

- Use adult briefs or underwear liners in case of an accident.
- Keep a bell or phone at your bedside or chair to ask for help when you need to get up.

- Remove furniture and rugs on the way to the bathroom to allow you to get there safely.
- Set a schedule so that you visit the bathroom every 2-3 hours during the day.
- Wear clothing that is easy to get off such as pants with Velcro closures or elastic waistbands.

Assistive bathroom equipment that may be helpful (available at most local pharmacies):

- Bedside commode or a urinal for use at night
- Commode frame over the toilet to give support while sitting and standing
- Toilet seat elevator

Additional information

For additional information on post-stroke recovery, please visit https://careguides.med.umich.edu/browse-by-medical-service/stroke or ask your healthcare team for one of the dedicated handouts listed below:

☐ Coping with Cognitive Changes After Stroke

☐ Physical Activity for Stroke Survivors

☐ BORG RPE Scale

☐ After a Stroke: Speech-Language Pathology (SLP)

☐ Occupational and Physical Therapy's Role in Stroke Rehabilitation

☐ Diplopia

☐ Homonymous Hemianopia

☐ Essential Home Equipment for Adapting After Stroke

☐ Coping Strategies to Manage Stress

☐ Importance of Leisure After Stroke

☐ Managing Daily Activities After Stroke

☐ Sexuality After a Stroke: Encouragement, Support & Advice for Stroke Survivors

☐ Stress Management and Relaxation Techniques after Stroke

☐ Traveling After Stroke

☐ What I need to know after having a seizure or loss of consciousness: A message about safety for our patients

Preparing for Discharge from the Hospital

Leaving the hospital may seem scary to you and your family because so many things may have changed. When you are ready to leave the hospital, your stroke team will work with you to create a discharge plan. Your recovery from a stroke is not limited to the time you spend in the hospital. The discharge plan will help provide a safe transition out of the hospital and cover all your plans for continued rehabilitation if needed.

Discharge location

Your stroke and rehabilitation team will help you select the right place for you after your discharge from the hospital. There are several different places for you to consider:

Type of facility or service:	What they offer
Inpatient Rehabilitation (IPR)	A separate unit of a hospital that provides hospital-level care for intensive rehabilitation
Subacute rehabilitation (SAR) or a Skilled nursing facility (SNF)	A facility which provides rehabilitation care and skilled nursing services for patients who are not well enough to be discharged home and cannot tolerate the amount of intensive therapy provided by inpatient rehabilitation

Assisted Living Facility	A facility which provides long-term basic nursing care and assistance for people who need help with everyday activities
Home therapy	Therapy provided in the home to those who are well enough to live at home but have difficulty leaving the home
Outpatient therapy	Therapy received at a rehabilitation clinic
Hospice	Services to reduce pain and suffering and increase quality of life. Services include medical, psychological, spiritual, and end-of-life support at home, in a rehabilitation facility, or at a residential hospice facility

When do I need to seek emergency care?

Call 911 immediately if you have any of the following symptoms:

- Sudden numbness or weakness of the face, arm, or leg on one side of the body
- Sudden confusion
- Sudden difficulty talking or understanding
- Sudden loss of vision in one or both eyes
- Sudden trouble with walking, balance, or coordination
- Sudden and severe headache for no known reason
- Worsening chest discomfort
- Worsening shortness of breath
- Other issues that may be immediately life-threatening

If you get to the hospital soon after having symptoms, there may be treatments available that can stop a stroke or reduce the chance of disability.

Who should I call if I have stroke-related questions?

Monday through Friday, 8 am to 5 pm:

- Call the Stroke Clinic Patient Care Line: **(888) 287-1082**

After 5pm, weekends or holidays:

- Call **(734) 936-6267** and ask to speak to the Neurology Resident on call.

When should I call my primary care doctor?

For general medical questions or concerns such as medication refills, blood pressure control, and diabetes management, please call your primary care doctor.

What type of follow-up appointments will I have?

Michigan Medicine Stroke Neurology clinic:

- You will have an appointment at the Stroke Clinic 1-3 months after discharge.
- You will get a notification with the appointment date within 1 week of discharge.
- If you have not received your Stroke Clinic appointment within 1 week of discharge, please call the patient care line at **(888) 287-1082** to schedule your appointment.

Neurosurgery:

- If you had a hemorrhagic stroke or a neurosurgical procedure, you may also have a follow-up appointment in the Neurosurgery Clinic.
- You will get a notification with the appointment date within 1 week of discharge.
- If you have not received this appointment date, please call the neurosurgery patient care line at **(734) 936-7010** to schedule your appointment.

Your doctor (also called Primary Care Provider or PCP):

- You will need to make an appointment with your doctor within 1-2 weeks after discharge.
- If you do not have a doctor, talk to your neurology team about getting one. They can place a referral for you.

Medicine Stroke Bridge Clinic:

- Your neurology team may also refer you to the Medicine Stroke Bridge Clinic to see Dr. Levine.
- If you do not have a PCP, you may receive care through the stroke bridge clinic until you can get an appointment with a new PCP (which can take several months).

Homecare:

- If you meet the conditions for home health services, the homecare agency will call you to schedule a time to come out for a visit.
- If you have not heard from the homecare agency after 24 hours, give them a call. You will find their phone number on the after visit summary (AVS) you received from your nurse at the time of discharge.

Outpatient therapy:

Michigan Medicine rehabilitation (Physical, Occupational, or Speech Language):

- If you received referrals for outpatient therapy through Michigan Medicine, the therapy teams will call you to schedule these appointments.
- If you have not heard from them within 7-days after discharge, you can contact them to schedule the appointments.

Physical and occupational therapy: **(734) 936-7070**

Speech language pathology: **(734) 763-4003**

Local rehabilitation facility outside of Michigan Medicine
You will need to hand carry a referral over to the facility which you choose. You can get signed referrals before discharge or receive them from your primary care doctor.

Imaging:

- You may need follow-up imaging such as an MRI or CT scan.
- Most imaging studies are scheduled for you before discharge. You can call the radiology department at **(734) 936-4500** to schedule or reschedule your imaging appointment.

What is a mobile cardiac telemetry study?

You may be asked to wear a portable heart monitor at home to look for an abnormal heart rhythm that can cause a stroke or Transient Ischemic Attack (TIA). This is called a **mobile cardiac telemetry study.** These monitors can be used to continuously monitor your heart's electrical activity. It may be placed before discharge or will be mailed to your home within 1 month.

If you have any questions regarding the heart monitor, you can contact the Stroke Neurology clinic patient care line at **(888) 287-1082.**

How can I successfully monitor my blood pressure at home?

High blood pressure (hypertension) is the leading cause of stroke and TIA. It is also the most important controllable risk factor to prevent another stroke or TIA. Please see the handout "Blood Pressure Management after Ischemic Stroke or TIA" following this chapter for simple steps to help you control your blood pressure and reduce your risk of another stroke or TIA.

Returning to work and driving

Returning to work and driving after a stroke is often a major concern. Be sure to discuss your ability to work and drive with your stroke team before discharge. If you are given restrictions, you can discuss how to safely return to these activities at your follow-up appointment in the Stroke Neurology clinic or with your doctor.

Tips for a successful discharge

- Ensure you have all your personal items with you (glasses, dentures, hearing aids, phone, walker and cane).
- Ask a family member or friend to arrive early to review final discharge instructions with you and your nurse.
- Review your discharge instructions with your nurse. Ask any questions you may have about your care. You can write these questions in the space provided below.

Before discharge, ensure you understand the following:

☐ Your medications and prescription information

☐ Signs and symptoms of stroke and when to call 9-1-1

☐ Allowed activities and restrictions

☐ Follow-up appointment information

Questions:

Preventing Ischemic Stroke

You can reduce your risk of ischemic stroke or transient ischemic attack (TIA). The best way to protect yourself from a recurrent stroke or TIA is to understand what factors increase your risk and how to control them. You can work with your doctor to treat and control many of your personal risk factors for stroke.

What risk factors can I help control?

- High blood pressure
- Diabetes
- High cholesterol
- Obesity
- Lack of physical activity
- Diet high in concentrated sugar and saturated fat
- Tobacco use
- High alcohol intake
- Illegal drug use

What steps can I take to reduce my risk factors?

1. **Control your blood pressure**
   High blood pressure (called **hypertension**) is the leading cause of stroke and the most important controllable risk factor for stroke. Please see the

handout “Blood Pressure Management After Ischemic Stroke or Transient Ischemic Attack” for detailed instructions on how to monitor your blood pressure at home. Work with your primary care doctor to reach your goal blood pressure.

2. **Control your diabetes**

   If you have diabetes, your chance of having a stroke is 1.5 times higher than a person who does not have diabetes. You can lower your risk of stroke by taking the following steps to manage your diabetes:

   - Work with your doctor to understand your blood sugar goals.
   - Measure and record your blood sugars as instructed by your doctor.
   - Take your diabetes medications as instructed by your doctor.

3. **Stop smoking**

   Tobacco use damages your blood vessels. This can lead to blockages within those vessels which can cause a stroke. Follow these tips to help you stop smoking:

   - Create a plan with your doctor to quit smoking.
   - Contact **MHealthy Tobacco Consultation Services** to learn about group and individual quit-smoking programs.
     - Call: (734) 998-6222
     - Visit: http://www.mhealthy.umich.edu/tobacco

4. **Improve your diet**

   - Follow a **Mediterranean-type diet** which emphasizes vegetables, fruits, whole grains, low-fat dairy products, poultry, fish (1-4 servings a week), legumes, olive oil, and nuts. This diet limits the amount of sweets and red meats you eat.
   - Contact Michigan Medicine’s **Nutrition Services Program** for individual counseling as well as interactive group workshops

- Call: (877) 885-8444
- Visit: http://www.uofmhealth.org/conditions-treatments/heart-nutrition

5. **Exercise regularly**
   - Create a good exercise routine. This will vary from patient to patient after stroke.
   - Talk with your doctor and rehabilitation team to determine the best activity for you.

6. **Limit alcohol**
   - Talk to your doctor if you need help reducing your alcohol intake.
   - Contact **MHealthy Alcohol Management Program**:
     - Call: (734) 998-2017
     - Visit: http://mhealthy.umich.edu/alcohol

7. **Avoid using recreational drugs**

   Intravenous (injection) drug use and cocaine use have been linked to an increased risk for stroke. Stop using these substances to reduce your risk of stroke. Talk to your doctor if you need help quitting.

8. **Take your medications as prescribed by your doctors.**

Medications and stroke prevention

After your stroke, your doctor may prescribe medications to prevent another stroke or TIA. It is important that you and your family understand each of these medications.

Medication Classification	How do they work?
Anticoagulants (blood thinners) Coumadin (Warfarin) Apixaban (Eliquis) Rivaroxaban (Xarelto) Dabigatran (Pradaxa) Enoxaparin (Lovenox)	Help prevent blood clots from forming, especially for those who have **atrial fibrillation** (an irregular and often rapid heartbeat)
Antiplatelet Medicines Aspirin Clopidogrel (Plavix) Ticagrelor (Brilinta)	Help stop platelets from sticking together and help prevent blood clots
Statins (cholesterol lowering medicines) Atorvastatin (Lipitor) Rosuvastatin (Crestor) Simvastatin (Zocor) Pravastatin (Pravachol) Lovastatin (Altoprev) Fluvastatin (Lescol)	Help lower the amount of cholesterol in your blood. They also help reduce inflammation in your blood vessels

For additional information on preventing stroke, please visit https://careguides.med.umich.edu/browse-by-medical-service/stroke or ask your healthcare team for one of the below dedicated handouts:

☐ Physical Activity for Stroke Survivors

☐ BORG RPE Scale

☐ Heart Healthy Eating

☐ Controlling Your Risk Factors for Ischemic Stroke

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

Blood Pressure Management After Ischemic Stroke or Transient Ischemic Attack

High blood pressure (hypertension) is the leading cause of stroke and Transient Ischemic Attack (TIA). It is also the most important controllable risk factor to prevent another stroke or TIA. This handout provides simple steps to help you control your blood pressure and reduce your risk of another stroke or TIA.

What steps can I take to successfully monitor my blood pressure at home?

1. Purchase a blood pressure unit (see below).
2. Understand your blood pressure goals (page 2).
3. Understand how to properly monitor your blood pressure at home (page 3).
4. Use a home blood pressure log (page 4).

What do I need to consider when buying a home blood pressure unit?

There are many different machines available for home blood pressure monitoring. Here are some key points to look for when buying a new unit:

- Use only upper arm (not wrist or finger) units. Only upper arm units produce reliable measurements.
- Fully automatic electronic units are the easiest to use.
- Omron 3+, 5+, and 7+ series are recommended, as they have been validated by the Association for the Advancement of Medical Instrumentation (AAMI) to be accurate. Visit https://www.validatebp.org/ for a detailed list of blood pressure monitors which have been validated for accuracy.
- Purchase and use the correct sized cuff for your arm. This is guided by the measurement of the middle part of your upper arm (circumference). Most units recommend cuff size based on this measurement. If you have

a large upper arm, buy a large blood pressure cuff. Omron and A&D both offer larger cuffs for their machines.

    - My upper arm circumference is _____inches on my **right** arm or **left** arm (circle which arm you measured)

- You can purchase units at most local pharmacies and through many online resources.
- You can ask your provider for a prescription to obtain a home blood pressure unit. Coverage depends on your insurance provider.

What is my blood pressure goal?

- It is important to note that in the first few days following a stroke or TIA, your neurologist will likely allow your blood pressure to run slightly higher than normal. This is called **permissive hypertension**.
- After this period, the long-term target blood pressure goal is **less than 130/80 mmHg** for most stroke and TIA patients.
- There are some special circumstances in which your blood pressure goal might be slightly higher than this. It is important to talk to your neurology team to confirm your target blood pressure goal. The American Heart Association (AHA) recommends that you see your doctor or provider every 4 weeks until your blood pressure is controlled to goal.

How do I measure my blood pressure?

Use the detailed instructions in the infographic below to measure your blood pressure at home.

When should I notify a doctor?

- If your blood pressure is **above goal for 5 days in a row**.
- Call a doctor **immediately** if the systolic blood pressure (top number) is above **180** or the diastolic (bottom number) is above **120.**
- Remember to bring your log to your doctor's appointment.

What Steps Should I Take When Checking My Blood Pressure (BP) at Home?

Before

2 Hours — 2 hours before your BP is taken:

 No Alcohol

 No Eating

30 Min — 30 minutes before your BP is taken:

 No Tobacco

 No Caffeine

 No Exercise

5 Min — 5 minutes before your BP is taken:

 Have log sheet ready to record BP

 Sit still and relax in a chair with a back and don't talk for 5 minutes

Take home BP readings no more than twice a day, ideally between 6am-10am and 6pm-10pm. Take BP before or at the same time as taking high blood pressure medications.

During (When taking your BP)

- Use correct cuff size for your arm
- Put cuff on bare upper arm with arrow or tubing on inside of elbow
- Sit in a chair with your back straight and feet flat on the floor
- Support arm at heart level on a flat surface
- Do not talk while taking your BP

Record only the third BP Reading

- Take your blood pressure measurements three times in a row, waiting 30-60 seconds between each reading. Record only the third reading.
- Record measurements in your BP log 

Home blood pressure log

My target blood pressure: _____/_____

Date	AM	PM	Notes

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CVC #1415

Stroke Resources

You do not have to recover from your stroke alone. Your network, from caregivers and support groups, can help rehabilitate your mind and body. Listed below, you will find many resources to help you and your support person(s) move forward with your recovery and help address any barriers you may face during your recovery.

Resources for Patients and Caregivers

- Michigan Medicine Stroke Support Group
  - See flyer located at the end of this chapter for additional information
  - Contact: UMstrokesupportgroup@med.umich.edu

- Michigan Medicine Aneurysm Support Group
  - Contact: Meghan Wind, LMSW
    - Email: mlwind@med.umich.edu
    - Phone: (734) 803-1262

- Young Adult Stroke Survivors Support Group
  - Contact: Susan Emery
    - Email: susan@circleofrights.org
    - For more information: https://www.stroke.org/en/stroke-groups/young-stroke-group

- Area Agency on Aging- Support for adults ages 60+ and their caregivers
  - For more information: https://www.osapartner.net/miseniors/Default.aspx

- Michigan Medicine Living with Low Vision Support Group
  - Contact: Gale Oren
    - Phone: (734)763-9468
    - Email: goren@med.umich.edu
  - For more information: https://www.umkelloggeye.org/patient-resources/support-groups/living-with-low-vision-group

- University of Michigan Aphasia Program (UMAP)
  - Phone: (734) 764-8440
  - For more information: https://mari.umich.edu/ucll/umap

- Applying for Social Security Disability Benefits After a Stroke
  - For more information: https://www.stroke.org/en/life-after-stroke/recovery/managing-your-stroke/finances-insurance-and-assistance/social-security-disability-benefits-after-a-stroke

For additional resources, please visit https://careguides.med.umich.edu/browse-by-medical-service/stroke or ask your healthcare team for one of the below dedicated handouts:

☐ Finances After Stroke Guide

☐ The Stroke Family Caregiver

☐ How Can I Support My Loved One?

☐ How Should I Communicate with Heart and Stroke Patients?

☐ What is Caregiver Burnout

☐ 7 Practical Tips for Self-Care

Stroke Support Group

For Stroke Survivors, Their Families, & Caregivers

Why should I attend a support group?

Finding groups to connect with can be challenging. This is a safe place to confidentially share your trials and triumphs with a group of your peers. Michigan Medicine staff members attend to guide discussions and provide information.

Our mission

The purpose of this group is to provide stroke survivors and their support persons an opportunity to support each other and build new friendships as they strive for recovery, meaning, and well-being.

Additional details

- No fees associated.
- Participants must provide their own phone or computer/internet access.
- Video capability is not required.

When:

Day: 2nd Tuesday of every month
Time: 2:30 – 4:00 P.M.

Where:

Meetings take place virtually on the HIPPA-aligned video conferencing platform, “Zoom for Health.”

Questions?

Please email the Stroke Support Group at UMstrokesupportgroup@med.umich.edu for details on how to attend.

MICHIGAN MEDICINE

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Glossary of Stroke Terms

This glossary contains a number of terms you may hear when your doctor talks about stroke.

Acute Stroke	A stage of stroke that starts at the beginning of symptoms and lasts for a few hours after.
Agnosia	The inability to process and recognize sensory information like objects, persons, shapes, or smells. It is not memory loss.
Aneurysm	A weak or thin spot on an artery wall that has stretched or ballooned out from the wall and filled with blood.
Aphasia	Difficulty understanding what is said, finding the words to say, putting words in sentences, and difficulty reading and writing words or sentences.
Arteriovenous Malformation (AVM)	Unusual tangles of blood vessels that cause multiple irregular connections between the arteries and veins.
Apraxia	When your brain has difficulty organizing muscle movements in the correct order.
Atherosclerosis	A disease in which plaque builds up inside your arteries. This narrows the arteries and blocks blood flow to the brain, which increases the risk for a stroke.
Atrial Fibrillation (**also called AFib** or **AF**)	A heart rhythm disorder that can lead to the formation of blood clots that may cause a stroke.
Cardioembolic stroke	A stroke caused by a clot that forms in the heart and then goes to the brain is called an embolic stroke or cardioemoblic stroke.

Carotid artery	An artery, located on either side of the front of the neck, which supplies the front part of the brain with blood.
Central Stroke Pain (Central Pain Syndrome)	Pain that can occur after stroke as a result of damage to an area in the brain called the thalamus. The pain can be a mixture of sensations, including heat and cold, burning, tingling, numbness, sharp stabbing and underlying aching pain.
Cerebrospinal fluid (CSF)	Clear fluid that bathes the brain and spine.
Cerebrovascular Disease	One or more diseases caused by blood flow (circulation) problems, such as blood flow restriction or a blockage or clot, in vessels that supply blood to the brain.
Cholesterol	A waxy substance produced naturally by the liver and also found in foods. Extra cholesterol leads to a buildup of plaque in the arteries and increases the risk of stroke and heart attack.
Cognitive Impairment	Difficulty with thinking abilities such as paying attention, memory, communication, and problem solving.
Depression	A medical condition in which feelings of sadness, loss, anger, or frustration interferes with everyday life for weeks or more. It is common after a stroke.
Diabetes	A disease that increases a person's risk for stroke. The pancreas does not make enough **insulin** (a hormone that allows the body to absorb sugar). This prevents the body from properly processing food to use as energy and causes glucose (sugar) to build up in your blood.
Dissection	A tear in the inside wall of a blood vessel that can block blood flow, or cause blood clots that may cause a stroke.

DVT (Deep Vein Thrombosis)	A blood clot that forms in a vein deep in the body. If the clot detaches and moves to the lungs, it can cause a blockage known as a pulmonary embolism (PE) (see definition below) which can be life-threatening
Dysarthria	Difficulty saying words clearly due to problems with muscle strength and coordination.
Dysphagia	Difficulty with swallowing.
Edema	Swelling.
Embolic Stroke	A stroke caused by a clot that forms in the heart and then goes to the brain. The clot is called an **embolus** (a free-floating mass traveling through the bloodstream). The embolus may be a blood clot (thrombus), a ball of fat, a bubble of air or gas (gas embolism), or foreign material
Embolus	A free-floating mass traveling through the bloodstream. It can be a clot, plaque or other material that travels from one vessel in the body to another.
Endothelial wall	A flat layer of cells that make up the inside lining of a blood vessel.
Hemiparesis	Weakness on one side of the body.
Hemiplegia	Complete paralysis on one side of the body.
Hemorrhagic Stroke	Sudden bleeding into or around the brain. It is also called a brain hemorrhage or brain bleed.
High-density lipoprotein (HDL)	Also known as “good cholesterol”. HDL helps move the “bad cholesterol” from the arteries back to the liver so it can break down and leave the body.
Hyperlipidemia (High Cholesterol)	Too many lipids (fat) in the blood. Cholesterol and triglycerides (another fat) can form plaque between artery walls. This can cause a blockage or a clot that can

	travel throughout the body and increase the risk of a heart attack or stroke.
Hypertension (High Blood Pressure)	Continuously high blood pressure in the arteries. This means a measurement greater than or equal to: 140 mm/Hg **systolic** pressure (top number) over 90 mm/Hg **diastolic** pressure (bottom number).
Hypoxia	A state of decreased oxygen delivery to a cell so that the oxygen falls below normal levels.
Infarct	An area of tissue that is dead because of a loss of blood supply.
Infarction	A sudden loss of a tissue's blood supply causing the tissue to die.
Intracerebral Hemorrhage (ICH)	A type of stroke that occurs when a vessel within the brain leaks blood into the brain.
Ischemic Penumbra	Areas of damaged but still living brain cells arranged in a patchwork pattern around areas of dead brain cells.
Ischemic Stroke	Damage to the brain caused by lack of blood flow, usually from a clot.
Lacunar Infarction	When a small artery deep in the brain becomes blocked, causing a small area of damaged brain tissue.
Large Vessel Disease	Abnormalities in the large brain arteries.
Low-density lipoprotein (LDL)	Also known as the "bad cholesterol"; a compound that carries most of the total cholesterol in the blood and deposits the excess along the inside of arterial walls.
Microhemorrhage	A tiny area of bleeding in brain tissue.
Muscle Tone	When a muscle contracts, or the muscle's resistance to a stretch during a resting state.
Muscle Tension	When muscles of the body remain semi-contracted for a period of time in the resting state.

Neuroplasticity	The potential for the brain to reorganize and adapt as needed by creating new pathways.
Permissive Hypertension	When blood pressure is allowed to rise for a short amount of time to ensure that damaged brain tissues receive enough blood flow.
PFO (Patent Foramen Ovale)	A connection between the right and left side of the heart that is needed to allow blood and oxygen to mix in the womb before birth. When the connection does not close after birth, it is a potential pathway for a clot to travel to the heart and possibly cause a stroke.
Platelets	Structures found in blood that are known primarily for their role in blood clotting.
Pneumonia	An infection in one or both lungs.
Post Stroke Fatigue	Often confused with "being tired." It arrives without warning and rest does not always make it better. It may feel like you are at your limit physically, emotionally, or mentally.
Pulmonary Embolism (PE)	An artery in the lungs becomes blocked by a clot that has traveled from elsewhere in the body through the bloodstream. Severe cases can lead to loss of consciousness, abnormally low blood pressure, and sudden death.
SCD (Sickle Cell Disease)	A disease where a sudden defective protein causes the red blood cells to become stiff instead of flexible and form a sickle or crescent shape.
Seizure	Sudden, abnormal electrical activity in the brain which can cause loss of consciousness, muscle contractions or weakness.
Small vessel disease	Thickening and disease of tiny arteries deep in the brain.

Spasticity	A condition in which there is an abnormal increase in muscle tone or stiffness of muscle, which might interfere with movement, speech, or cause discomfort or pain.
Stenosis	Narrowing of an artery.
Stroke	Occurs when the blood supply to part of the brain is suddenly blocked, or when a blood vessel in the brain bursts, spilling blood into the spaces surrounding brain cells. There are two types of stroke: ischemic or hemorrhagic (bleeding)
Subarachnoid Hemorrhage	Bleeding within the outer covering of the brain into the clear fluid that surrounds the brain.
Thrombolysis	A treatment to break down blood clots by using clot-busting drugs.
Thrombosis	When a blood clot forms in one of the brain's arteries in the head or neck that stays attached to the artery wall until it grows large enough to block blood flow.
Thrombus	A blood clot that forms in a vessel and remains there.
Total Serum Cholesterol	A combined measurement of a person's high-density lipoprotein (HDL) and low-density lipoprotein (LDL).
Transient Ischemic Attack (TIA)	Temporary decrease in blood flow and oxygen to your brain which can lead to temporary symptoms and does not affect brain functioning long-term.
Vasospasm	A sudden narrowing of an artery which can lead to reduced blood flow.
Vertebral artery	A major artery on either side of the back of the neck that supplies blood to the back of the brain.