CEREBROVASCULAR ACCIDENTS

DISORDER

Definition

- A cerebrovascular accident (CVA), commonly known as a stroke, occurs when blood flow to a part of the brain is interrupted or reduced, either due to a blockage or the rupture of a blood vessel. This disruption prevents the brain from receiving adequate oxygen and nutrients, leading to the death of brain cells and damage to brain tissue (National Library of Medicine, n.d.) (Ellis, 2018).

Etiology

(Fletcher, 2023), (Ellis, 2018), and (National Library of Medicine, n.d.)

Ischemic stroke:

- Blood clots (thrombosis or embolism): blocks a blood vessel and prevents blood and oxygen from getting to a part of the brain.
- Atherosclerosis: narrowing of arteries due to plaque buildup
- Arterial dissection: a tear along the inside lining of an artery and can occur in a child's head, neck, or spine.

Hemorrhagic stroke:

- Hypertension causing weakened blood vessels
- Aneurysms: abnormal swelling or bulge in the wall of a blood vessel, such as an artery.
- Arteriovenous malformations: happen when a group of blood vessels in your body forms incorrectly.
- Trauma

Other Contributing Factors:

- poor diet
- lack of exercise
- Carotid artery disease
- Other vascular diseases

RISK FACTORS

(Boehme et al., 2017), (Nindrea & Hasanuddin, 2023), (Sutter Health, n.d.), and (Sabih et al., 2023).

NON-MODIFIABLE

Conditions that increase your chances of developing a disease and that you cannot change (UCSF Health, 2024).

Age (55 years or older)	The risk of stroke increases significantly with age due to the cumulative effects of vascular changes and the likelihood of developing other health conditions.
Family History of Stroke	A personal history of stroke increases the likelihood of recurrence, while a family history indicates a genetic predisposition to cerebrovascular diseases.
Genetic Predisposition	Certain genetic factors can increase the risk for conditions leading to stroke, though these are not modifiable.

MODIFIABLE FACTORS

Behaviors and Exposures that can be changed to reduce a person's risk of developing a disease or condition

Hypertension	High blood pressure is the most significant modifiable risk factor for stroke, leading to damage in blood vessels and increasing the likelihood of both ischemic and hemorrhagic strokes
Diabetes	Uncontrolled diabetes can damage blood vessels and nerves, increasing the risk of stroke. Effective management of blood sugar levels is crucial
High Cholesterol	Elevated cholesterol levels can lead to atherosclerosis, where arteries become narrowed or blocked, increasing the risk of ischemic stroke
Heart Disease (e.g., Atrial Fibrillation)	Conditions like atrial fibrillation can lead to embolic strokes as blood clots may form in the heart and travel to the brain
Obesity	Excess weight increases the risk of hypertension, diabetes, and high cholesterol, all contributing factors for stroke
Sedentary Lifestyle	Lack of physical activity can lead to obesity and other cardiovascular risks, increasing the likelihood of stroke
Excessive Alcohol Consumption	Drinking more than one drink per day is associated with a higher risk of stroke due to its effects on blood pressure and heart health
Smoking	Tobacco use damages blood vessels and promotes clot formation, significantly increasing stroke risk. Quitting smoking can reduce this risk substantially
Illicit Drug Use	Certain drugs, such as cocaine and methamphetamines, can cause sudden increases in blood pressure or promote clot formation, leading to strokes
Certain Medications (e.g., Blood Thinners for Hemorrhagic Stroke)	While necessary for some patients, the use of anticoagulants can increase bleeding risks in hemorrhagic strokes if not managed properly

Prevalence

Locally:

- The national stroke prevalence rate ranged from 0.486% to 6.0% (Collantes et al., 2022).

Internationally: (Virani et al., 2020)

- Significant public health concern, with millions affected globally.
- Approximately 795,000 strokes occur annually in the United States, with about 610,000 being first attacks.

Incidence

Locally:

- In the Philippines, the national stroke incidence rate ranged from 3.95% to 5.61% (Collantes et al., 2022).

Internationally: (Virani et al., 2020)

- The incidence rate varies by age, sex, and ethnicity.
- Higher rates observed in older adults, particularly those over 65 years.
- Incidence rates are approximately 145 per 100,000 individuals annually.
- Stroke is the fifth leading cause of death in the US.

Manifestations of the Disease that the Physician/Allied Health Medical Professional Perceives [SIGNS]

- Medical professionals utilize FAST to quickly identify if an individual is experiencing stroke (CDC, n.d.):
  - **F** - **Face**: Ask the person to smile. Does one side of the *face droop*?
  - **A** - **Arms**: Ask the person to raise both arms. Does *one arm drift downward*?
  - **S** - **Speech**: Ask the person to repeat a simple phrase. Is the *speech slurred or strange*?
  - **T** - **Time**: If you see any of these three signs, call 9-1-1 right away. Crucial to act fast as this is a medical emergency.
- Through the following tests, medical professionals may definitively identify stroke in patients (MedlinePlus, n.d.):
  - ***Physical Exams*** that check mental alertness, coordination and balance, numbness or weakness in the face and limbs, and trouble speaking and seeing clearly.
  - ***Diagnostic Imaging of the Brain*** *(such as MRI or CT Scan)*
  - ***Heart Tests*** *(such as EKG or Echocardiography)* which assists the detection of any heart problems or existence of blood clot that may have led to the stroke.
- Individuals post-stroke may have noticeable changes in their ability to think or reason, personality, memory, and judgment (MedlinePlus, n.d.).

Manifestations the Patient Experiences [SYMPTOMS]

According to the National Institute of Neurological Disorders and Stroke (n.d.), the following are the occuring symptoms by stroke or CVA:

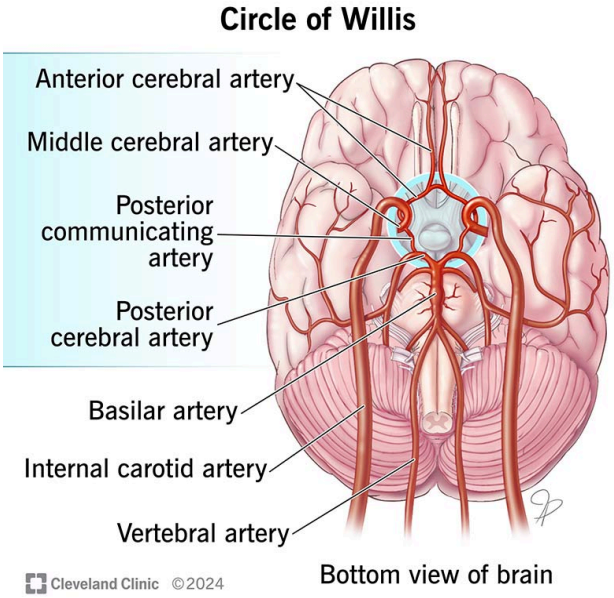
- Sudden numbness or weakness of the face, arm, or leg (especially on one side of the body)
- Sudden confusion, trouble speaking, or understanding speech
- Sudden trouble seeing in one or both eyes
- Sudden difficulty walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause
- The stroke itself can also make the person unaware of the problem (called ***anosognosia***).
- More rarely, people having a stroke may have disorientation or memory loss, drowsiness, double vision, nausea, dizziness, or vomiting.

- Post-stroke, individuals may find themselves having a hard time moving around and doing daily tasks such as dressing themselves, bathing, and feeding (MedlinePlus, n.d.).

Pathophysiology

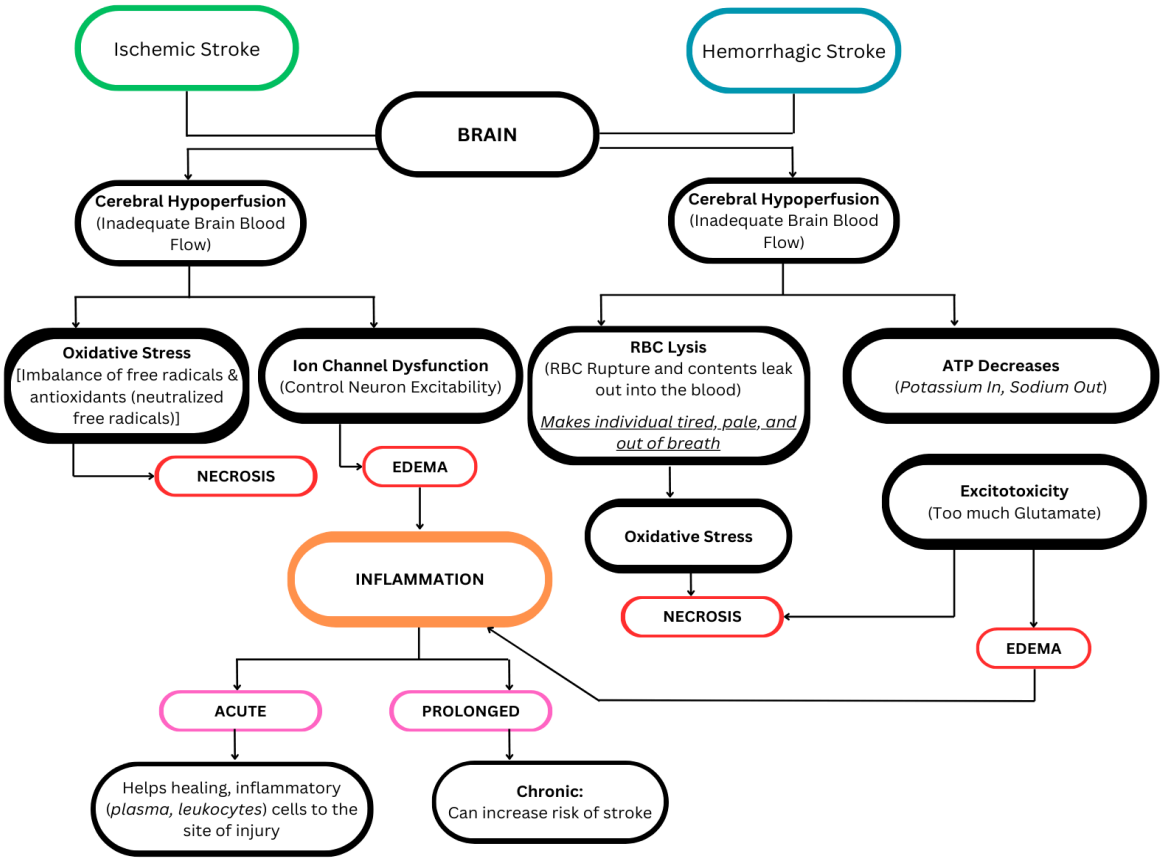
[Cleveland Clinic, n.d.; Kuriakose & Xiao, 2020]

In order to understand the manifestation of stroke, it is important to become familiar with the neurovascular anatomy first.



- As seen above, the **Circle of Willis (CoW)** is a network of arteries at the base of the brain that functions as a "*roundabout*" for the two major arteries that supply blood to the brain. The most essential blood flow to the brain is managed by:
  - Two (2) **Internal carotids**, anteriorly
  - Two (2) **Vertebral arteries**, posteriorly
- CoW also functions as a ***"fail-safe"***— if one of the two blood vessel pathways become damaged either from stroke or brain aneurysm, the other can still provide blood flow to the affected part of the brain.
  - An incomplete CoW, this roundabout doesn't work as a fail-safe. It may increase your risk for more severe effects of these cerebrovascular conditions, especially stroke.

- Stroke is defined as an abrupt neurological outburst caused by impaired perfusion through the blood vessels to the brain.



- Ischemic Stroke catalyzes thrombotic and embolic conditions in the brain.
  - **Thrombotic Stroke**: Occurs when blood flow is affected by the *narrowing* of the vessels due to **atherosclerosis**—the buildup of plaque.
  - **Embolic Stroke**: Occurs due to decreased blood flow to the brain region.
    - The decreased blood flow causes severe stress and untimely cell death or *necrosis*.
- Hemorrhagic Stroke is caused by blood vessels rupturing due to stress in the brain tissue and internal injury. This causes production of toxic effects in the vascular system, resulting into infraction.
  - **Intracerebral Hemorrhage** - Blood vessels rupture causing abnormal accumulation of blood within the brain.
  - **Subarachnoid Hemorrhage** - Blood accumulates in the subarachnoid space of the brain due to a head injury or cerebral aneurysm
- Key events contributing to the stroke pathology are necrosis inflammation, energy failure, loss of homeostasis, acidosis, increased intracellular calcium levels, excitotoxicity, free radical-mediated toxicity, cytokine-mediated cytotoxicity, oxidative stress, and infiltration leukocytes, as seen in the flow chart above.

Structural and Anatomical Changes Related to the Condition

[Talhada et al., 2019; Alexandrov & Krishnaiah, 2023]

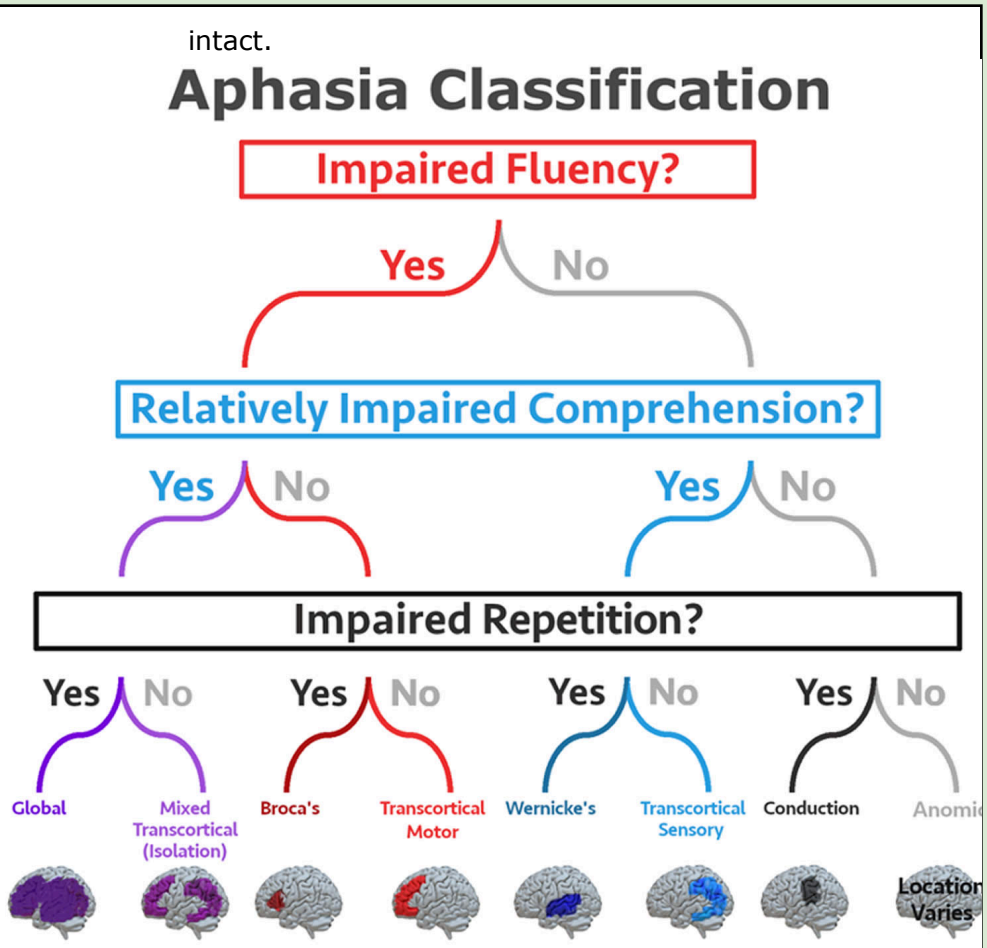
- After an **ischemic stroke**, there is noted to be a rapid and extensive loss of neurons and degeneration of *axons and dendritic spines* in remote areas in both ***ipsilateral and contralateral cortex***.
- After an ischemic stroke, limb muscle functions changes occur, thereby affecting their QOL and prognosis in patients. It could even lead to muscle atrophy shortly after the stroke.
  - The main feature that distinguishes ischemic stroke-induced muscle changes from those occurring with normal aging are (1) **muscle reinnervation**, (2) **muscle inflammation**,

(3) **disuse muscle atrophy**, (4) **protein synthesis and catabolism**, (5) **muscle fiber type transformation**, (6) **changes in muscle mitochondrial function**, and (7) **nutrient supply**.

- In a particularly *large* **hemorrhagic stroke**, there would be a notable increase of pressure within the skull which could push the brain downward, forcing it through the rigid structure that separates the brain into compartments. This results in herniation which could bring about serious problems.
    - Pressure may be put on areas controlling consciousness and breathing.
    - If not addressed, herniation could cause loss of consciousness, coma, irregular breathing, and even death.

Possible SLP Areas Affected and Their Characteristics
(American Speech-Language-Hearing Association, n.d.)

Language	• Stroke survivors may experience a range of communication deficits, which can be categorized into language impairments (e.g., aphasia), motor speech disorders (e.g., dysarthria), and cognitive-communication disorders. These deficits affect the patient's ability to understand and produce language, impacting their quality of life. • Aphasia: A language disorder that affects a person's ability to communicate. Difficulty in language production and comprehension. Types include expressive aphasia (difficulty speaking) and receptive aphasia (difficulty understanding). Here are some common types of aphasia seen in stroke survivors (Types of Aphasia, n.d.): ◦ Broca's Aphasia (Non-Fluent Aphasia) ▪ Characteristics: Individuals struggle to find and articulate the right words, leading to very limited speech, often restricted to short phrases or single words. ▪ Understanding: They typically understand spoken language well and can read but may have difficulty writing. ▪ Frustration: The inability to express thoughts clearly can be particularly frustrating for sufferers. ◦ Wernicke's Aphasia (Fluent Aphasia) ▪ Characteristics: People can produce long sentences that may lack meaning or coherence. They may not realize their speech is nonsensical. ▪ Understanding: Comprehension of spoken language is impaired, affecting both reading and writing abilities. ▪ Communication: Their speech is fluent but does not convey meaningful content. ◦ Anomic Aphasia ▪ Characteristics: This type is marked by difficulty in finding the right words, especially nouns and verbs, leading to vague expressions. ▪ Speech Quality: While speech may be grammatically correct, it often lacks specific content, causing frustration for the individual. ◦ Primary Progressive Aphasia (PPA) ▪ Characteristics: Unlike other types, PPA is a degenerative condition where language abilities gradually decline over time. ▪ Impact on Functions: Individuals may experience a slow loss of reading, writing, speaking, and understanding skills while other cognitive functions remain relatively

	intact. 
Cognitive (American Heart Association, 2024), (Al-Qazzaz et al., 2014)	• Cognitive Communication Disorders: These disorders involve difficulties with thinking skills that are important for communication, such as memory, attention, and problem-solving. May manifest as difficulty following conversations or organizing thoughts. ◦ Memory: Difficulty remembering short-term events or people you've met recently ◦ Attention: Difficulty concentrating or being easily distracted ◦ Planning: Difficulty knowing how to start something or doing things in the right order ◦ Problem-solving: Difficulty understanding and fixing problems ◦ Judgment: Making choices that don't make sense or doing things that are unsafe or uncomfortable ◦ Insight: Difficulty understanding your difficulties and how they impact your life ◦ Spatial neglect: Problems noticing things on one side ◦ Visual perception: Problems controlling movement and finding your way around ◦ Anosognosia: Confusion and denial ◦ Agnosia: Problems recognizing things
Speech (Communication Problems, n.d.) (How a Stroke Can Affect Your Speech, n.d.)	These include conditions like dysarthria, where the muscles used for speech are weakened, and apraxia, where the patient has difficulty planning and coordinating the movements required for speech. • Apraxia of Speech: Difficulty planning and coordinating the movements needed for speech. Individuals may know what they

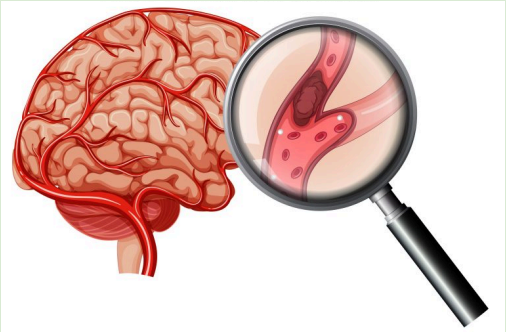
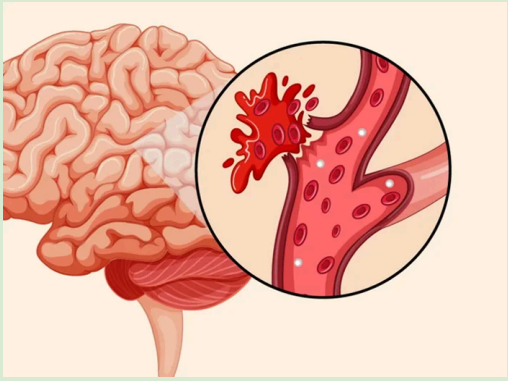
	want to say but struggle to articulate it. • Dysarthria: Difficulty saying words clearly due to muscle weakness that may affect one or both sides of your lips, jaw, tongue and/or soft palate. • Dyspraxia: Difficulty speaking due to a problem with the nerve connection between the brain and mouth. • Dysphonia: Weakness or paralysis in the muscles around the vocal cords, which can make the voice sound hoarse, rough, or like a whisper.
OPM (Marzouqah et al., 2022), (Skott et al., 2023)	• Muscle weakness: Muscles in the lips, tongue, and throat can be weakened, leading to difficulty eating and swallowing. • Reduced sensation: Reduced sensation in the mouth can make it difficult to prepare and transport food. • Dysphagia: A swallowing disorder that can lead to prolonged meals, malnutrition, and airway complications. • Dysarthria: A motor speech disorder that can cause slurred speech. • Central facial palsy: Can affect a person's ability to communicate and express themselves. • Obstructive sleep apnea: Weakness in the oropharyngeal muscles can lead to obstructive sleep apnea.

Feeding and Swallowing	• Dysphagia is a common consequence of stroke, affecting up to 50% of acute stroke patients. Challenges in swallowing, which can lead to aspiration and nutritional issues. Dysphagia can cause a variety of symptoms, including:
	  ○ A feeling of food or liquid stuck in the throat
	  ○ Drooling
	  ○ Coughing or choking while eating or drinking
	  ○ Gagging
	  ○ A wet or gurgly voice after swallowing
	Early identification is important to prevent complications like aspiration pneumonia, undernutrition, and dehydration.
	• Loss of appetite: A stroke can cause loss of appetite, which can lead to malnutrition.

Voice	• Dysphonia: Weakness or paralysis in the muscles in and around the vocal cords. Your voice might sound like a whisper, or it might sound hoarse or rough. If you cannot make any sound at all, it is called aphonia (Communication After Stroke Fact Sheet, n.d.).

Types, Disease Course, Prognosis

TYPES OF CVA	
Ischemic Stroke	• Stroke that occurs due to a ***blockage*** in the blood vessel that supplies blood flow to the brain. This causes the brain cells and tissues to begin to die due to lack of oxygen and nutrients (Hopkins, n.d.). Said blockages are either blood clot or a build-up of a fatty substance called *plaque* (Brigha m and Women's Hospital, n.d.).

 *Further subdivided into the following:*	
Embolic Stroke (Hopkins, n.d.)	• Stroke that is usually caused by a blood clot formation anywhere else in the body and travels through the bloodstream to the brain. • Often due to heart disease or heart surgery. • Occur rapidly and without any warning signs.
Thrombotic Stroke (Hopkins, n.d.)	• Stroke that is usually seen in older individuals with high cholesterol and *atherosclerosis* or diabetes and occurs due to a thrombus (blood clot) developing in the arteries supplying the blood to the brain. • May occur suddenly during sleep or in the early morning. • May also occur gradually over a period of hours or even days. • This type of stroke may be preceded by a "*mini-stroke*" or Transient Ischemic Attacks (TIA)
Hemorrhagic Stroke  *Further subdivided into the following:*	• Stroke that occurs when a blood vessel that is responsible for supplying the brain *ruptures* and ***bleeds***. In turn, the brain cells and tissues do not get oxygen and nutrients (Hopkins, n.d.)
Intracerebral Hemorrhage (Hopkins, n.d.)	• Bleeding of blood vessels within the brain causes the stroke; bleeding occurs suddenly and rapidly. • Can be severe enough to cause coma or death.
Subarachnoid Hemorrhage	• Bleeding occurs between the brain and the meninges in the *subarachnoid space*, often due to aneurysm or an arteriovenous malformation (AVM) or due to trauma (Hopkins, n.d.).
Transient Ischaemic Attack (TIA)	• Resembles an ischemic stroke, but lasts a significantly shorter time, specifically between a few minutes to 24

	hours. In most cases, symptoms begin to disappear in an hour. • Due to this, TIA may not cause extensive and permanent damages (Brigham and Women's Hospital, n.d.).

Progression of the Condition

- Stroke, or cerebrovascular accident (CVA), typically follows a course divided into ***acute***, ***subacute***, and ***chronic phases*** (Wu et al., 2015).
  - **Acute Phase** - Lasts 24-72 hours; is characterized by rapid symptom onset and potential neurological deterioration.
  - **Subacute Phase** - Spans days to weeks, where symptoms stabilize and rehabilitation begins.
  - **Chronic Phase** - Lasts weeks to months, involves ongoing recovery and adaptation.

Outcome if Left Treated and/or Untreated

- If treated:
  - **Improved survival rates**
  - **Better recovery of motor, speech and cognitive functions** with the help of rapid treatment and rehabilitation. Extent of recovery depends on the size and location of the stroke, as well as how soon the treatment began (Better Health Channel, 2015).
  - **Reduced long-term disability**
- If left untreated:
  - **Increased risk for long-term disability**; this often includes paralysis, speech difficulties, swallowing difficulties, cognitive impairments, and issues with balance and coordination (CBC Health Doctors, 2021).
  - **Reduced quality of life.**
  - **Risk of complications** such as brain swelling, increased intracranial pressure, and recurrent strokes. Individuals with untreated stroke are also at risk of developing pneumonia, deep vein thrombosis, and urinary tract infections (Cooper University Health Care, n.d.).
  - **Higher mortality rates**.

Medical/Surgical Management

Door-to-treatment of 60 minutes referred to as **Golden Hour**.

↪ During this, the chances of restoring blood flow and saving blood flow are the greatest. Treatment is most effective at this time and has the fewest side effects.

Medication	Medicinal treatments for stroke include (NHS, 2024):
	• ***Anticoagulants*** to stop blood clots forming.
	  ○ e.g. *Direct Oral Anticoagulants, Low Molecular Weight Heparin Anticoagulants.*
	• Medicines that ***lower blood pressure***.
	  ○ Diuretics
	  ○ Beta-blockers
	  ○ ACE inhibitors
	  ○ Angiotensin II receptor blockers
	  ○ Calcium channel blockers
	  ○ Alpha blockers
	  ○ Alpha-2 receptor agonists
	  ○ Vasodilators
	  ○ Amlodipine

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- ***Statins*** to *lower cholesterol*.
- **Antiplatelets**: Most people will be given aspirin straight after having an ischemic stroke. As well as being a painkiller, aspirin is an antiplatelet, which reduces the chances of another clot forming.

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For Ischemic Stroke (National Heart, Lung, and Blood Institute, n.d.):

- ***Tissue Plasminogen Activator (tPA)*** breaks up blood clots that block blood flow to the brain. Given within 3 hours after stroke symptoms start.

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For Hemorrhagic Stroke (National Heart, Lung, and Blood Institute, n.d.):

- Medicines that lower blood pressure.
- In this case, blood thinners or anticoagulants should not be taken.
- Intake of ***Vitamin K***.

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Surgery
(National Heart, Lung, and Blood Institute, n.d.)

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For Ischemic Stroke:

- ***Thrombectomy*** is the surgical removal of the clot from the blood vessel.
- ***Angioplasty*** and ***Stenting*** is a procedure that opens up the blocked artery.
- ***Carotid Endarterectomy*** is the surgical removal of plaque from the carotid artery.

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For Hemorrhagic Stroke:

- ***Aneurysm Clipping*** helps stop bleeding from an aneurysm that can also help prevent the aneurysm from bursting again.
- ***Coil Embolization*** will cause a blood clot to form, which will block blood flow through the aneurysm and prevent it from bursting again.
- ***Draining Excess Fluid*** can help relieve the pressure on the brain.
- ***Surgery to temporarily remove part of the skull*** allows more room for the brain to swell without putting pressure on it.
- ***Surgery or radiation to remove or shrink an arteriovenous malformation (AVM)***
- ***Surgery to remove pooled blood***; this is typically done if an individual shows signs of getting worse.

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Supportive Treatments
(National Heart, Lung, and Blood Institute, n.d.)

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There may be a need for a further short-term treatment in some cases so as to help manage some of the problems that affect people who have had a stroke. These are the following things that may be required:

- ***Ventilator Support*** - Low levels of oxygen.
- ***Compression Therapy*** - Use of Compression stockings to prevent blood clots in the legs.

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	• ***Feeding Tube*** - provide nutrition if difficulty swallowing (dysphagia) is present. • ***Fluids*** - Aid in the restoration of proper blood pressure or volume.
Rehabilitation Therapy (Cleveland Clinic, n.d.) (Liaw et al., 2020)	Stroke entails several changes in the brain. Rehabilitation is one of the most important ways to help them recover and adapt to these changes and help them regain the abilities they had lost due to stroke. Rehabilitation can take many form: • ***Speech Therapy*** - Help regain language and speaking abilities as well as improve one's ability to control muscles that helps in breathing, drinking, and swallowing. • ***Occupational Therapy*** - Help retrain the brain in order to reduce issues with going about activities of daily life. Additionally, it is helpful in the improvement of precise and fine hand movements and muscle control. • ***Physical Therapy*** - Help improve or regain the ability to use one's hands, arms, feet, and legs, as well as help with balance issues, muscle weakness, and more. • ***Cognitive Therapy*** - Helpful if memory problems are present. Can also be helpful if there is a marked difficulty with activities that involve focus or concentration. • ***Respiratory Therapy*** - techniques for stroke patients focus on improving lung function, preventing respiratory complications, and facilitating mucus clearance.

SLP Therapy

Areas for Evaluation	Evaluation Materials	Treatment Strategies
Language	• **Western Aphasia Battery Test** - A diagnostic tool that assesses linguistic skills and main nonlinguistic skills. It also assesses fluency, auditory comprehension, repetition, naming, word finding, reading, writing, and drawing (Risser, 1982; Barfod, 2013). • **Boston Diagnostic Aphasia Examination** - A widely used standardized test battery for evaluating adults with acquired brain damage on reading, writing, verbal production, and auditory comprehension and includes summary scores across subtests (Goodglass et al., 2001). • **Bedside Evaluation Screening Test** - Assesses	• For **language**: ○ **Language Intervention Activities** (Sherred, 2019) are individualized exercises to improve language development. Examples of these include *structured questioning, use of purposeful interaction,* and etc.

	language competency in three communicative modalities: Auditory comprehension, Speaking, and Reading (West et al., 1998).	
Speech	• **Assessment of Intelligibility in Dysarthric Speech** - Tool for quantifying single-word intelligibility, sentence intelligibility, and speaking rate of adult and adolescent speakers with dysarthria (Yorkston, et al., n.d.)	• For **speech** (Jones, 2023): ○ **Oral-Motor Exercises** are utilized in conditions like *dysarthria*, exercises that strengthen oral muscles can be helpful. Specific exercises include *Tongue extension & retraction, tongue side-to-side, jaw opening, lip retraction and protrusion,* and more. ○ **Motor Speech Drills** are done for conditions like *apraxia* as repetitive practice of speech movements and sequencing can improve motor planning. Specific motor speech drills include *pitch glides, sustained phonation, repetition of syllables, progressive word building,* and more.
OPM	• **Oral Peripheral Mechanism Examination** - Test that looks into the range of motion, coordination, strength, and appearance of the oral mechanisms. Evaluating the structure and function of the mouth for speech production and/or swallowing. (Global Speech Therapy, n.d.)	
Cognition	• **Saint Louis University Mental Status Examination** - Used to diagnose aphasia and related disorders; evaluates	• For **cognition** (Denslow, 2024): ○ **Cognitive Exercises** is a rehabilitative exercise focusing on regaining

	various perceptual modalities [auditory, visual, gestural], processing functions [comprehension, analysis, problem-solving], and response modalities [writing, articulation, manipulation] (Goodglass, et al., 2001; Barfod & Figueiredo, 2012). • **Montreal Cognitive Assessment** - A highly sensitive tool for early detection of mild cognitive impairment; it looks into STM, Visuospatial abilities, executive functions, attention, concentration, working memory, language, and orientation (MoCA Cognition, n.d.) • **Mini-Mental State Exam** - Can be used to systematically and thoroughly assess mental status for adults with cognitive impairment.	the function of memory as it encourages neuroplasticity. These cognitive exercises include *memory exercises, problem-solving tasks, music-based therapies, visual scanning practice,* or *functional activity simulations*.
Feeding and Swallowing	• **Modified Barium Swallow Study** and **Fiberoptic Endoscopic Evaluation of Swallowing** are tests that determine the cause of the swallowing problem and whether aspiration is present or not, as well as the safest diet level (Crumbling, 2022). • **Mann Assessment of Swallowing Ability (MASA)** - Instrument designed for bedside evaluations for patients that need swallowing function assessment; gauges a patient's swallowing ability, in order to make appropriate recommendations for diet and fluid intake.	• For **feeding and swallowing**: ○ **Oral-Motor Exercises** - Utilized to target muscles involved in feeding and swallowing to improve strength, coordination, and mobility. ○ **Sensory Stimulation** - Use different sensory techniques to increase or decrease oral sensitivity, may include introducing various textures, temperatures, tastes, and smells to the mouth, promoting desensitization or increased awareness. ○ **Positioning and Postural Strategies** - Adjusting the client's body position during feeding can greatly impact their ability to

		swallow effectively. Strategies include *chin tuck, chin up posture, head rotation,* and *head tilt*. ○ **Modified Food and Liquid Consistencies** - Consuming different textures of food until swallow function improves. ○ **Maneuvers** - Specific strategies that clinicians use to change the timing or strength of particular movements of swallowing. It includes *effortful swallow, Mendelsohn maneuver* (elevate the larynx and open the esophagus during the swallow), *supraglottic swallow,* and *super-supraglottic swallow*.

Educational Management

(Demarco et al., 2011), (Hoang & Van Ballegooie, 2022), (YüCe et al., 2024), and (Maye, 2017)

- **Comprehensive Assessment of Needs**
  - Individualized Education Plans (IEP): Tailor educational interventions to each patient's specific needs, enhancing effectiveness by considering their cognitive and physical abilities post-CVA.
  - Involvement of Caregivers: Engage family members to ensure understanding and support for the patient's needs.
- **Structured Educational Programs**
  - Self-Management Education: Implement programs that empower patients in managing their health post-CVA, covering symptom recognition, medication management, and lifestyle changes
  - Use of Multimedia Resources: Leverage audiovisual materials tailored to cultural and linguistic backgrounds to improve comprehension and retention
- **Regular Follow-Up and Support**
  - Scheduled Follow-Ups: Establish regular appointments to reinforce education and adjust care plans as necessary.
  - Support Groups: Encourage participation in support groups for shared experiences and motivation.
- **Clear Communication of Services Available**
  - Informing About Available Services: Clearly communicate services such as rehabilitation therapies and mental health support to ensure effective access
  - Patient-Centric Communication: Use simple language to discuss treatment options, ensuring patients understand their choices.

- **Evaluation of Educational Effectiveness**
  - Feedback Mechanisms: Implement systems to evaluate educational interventions through patient surveys or discussions
  - Adjusting Strategies Based on Feedback: Continuously refine educational strategies based on patient input to maintain relevance and effectiveness.

Critical Members of the Management Team
(Heart and Stroke Foundation of Canada, 2024)

Neurologist	• The primary physician responsible for diagnosing and managing stroke.
Physiatrists	• Physiatrists oversee and tailor rehabilitation programs, working with patients to regain functional abilities through customized exercises, medication management, and adaptive strategies. (American Academy of Physical Medicine and Rehabilitation, n.d.)
Emergency Medicine Physician	• Manages acute stroke care, including initial assessment and stabilization. (Berekashvili et al., 2019)
Neurosurgeon	• Involved in cases requiring surgical intervention, such as intracranial hemorrhage or large vessel occlusion.
Stroke Nurse Coordinator	• Organizes and coordinates stroke care, providing patient education and support.
Respiratory Therapist	• Involved in monitoring and managing patients' respiratory status during and after these events.This might involve managing oxygen therapy, assisting with intubation and making sure that patients maintain adequate oxygen levels (Land, 2024).
Speech-Language Pathologist	• Assesses and treats speech, language, and swallowing difficulties.
Occupational Therapist	• Helps patients regain independence in daily living activities.
Physical Therapist	• Focuses on improving mobility and strength.
Radiologist	• Interprets imaging studies to diagnose stroke type and severity.
Cardiologist	• Evaluates cardiovascular risk factors and manages related conditions.
Clinical Psychologist	• Provides emotional support and counseling to patients and families.
Dietitian	• Offers nutritional guidance to manage dietary factors related to stroke.
Social Worker	• Assists with discharge planning and coordinating community resources.
Caregiver	• Coordinate care, manage medications, support rehab, provide emotional support, and encourage recovery and independence (American Heart Association, 2024).

Medical Precautions Regarding Speech-Language Therapy

Precautionary Measures		
• Control environment—make sure that the client is not put at risk by their surroundings. • Throughout the session, be wary of their physical limitations so as to prevent fatigue which might contribute to possible rising of their blood pressure.		
Before	**During**	**After**

Jones (2023)
• Gather essential documents and information.
• Identify goals for the session.
• Research potential ent approaches.
• Take vital signs before proceeding with therapy.
  ○ If anything is elevated, make sure to wait for it to settle before you proceed with the therapy.
	• In individuals with problems with swallowing, speech therapists must keep watch for signs of choking or aspiration; not only is this important in ensuring client's safety, this would also help the therapist to either make adjustments or employ new strategies that would minimize risks (MedlinePlus, n.d.)
	• Individuals with stroke often have language deficits, thus requiring us to adjust to the current skill of the client and utilize language that is more kin to their current skill so as to ensure that the client is understanding what is being said (MedlinePlus, n.d.).
	• Monitor Vital Signs throughout
	  ○ In case vital signs are elevated during activity, either stop the session or pause the task, and wait for it to settle.
		• Communicate with caregivers.
		  ○ Educate them on how to support communication and provide a consistent environment for practice.

Support Systems

LOCAL	
Stroke Society of the Philippines	The Stroke Society of the Philippines is an organization composed of healthcare professionals, including physicians and nurses, who are dedicated to stroke care, education, and research. Established in Manila on July 13, 1995, the society aims to reduce the incidence of stroke in the Philippines, decrease stroke-related morbidity and mortality, and enhance the quality of life for stroke survivors in the country. (Stroke Society of the Philippines, 2024)
INTERNATIONAL	
American Heart Association	The American Heart Association is a national voluntary organization focused on reducing disabilities and fatalities caused by cardiovascular diseases and stroke. (American Heart Association, n.d.)
National Stroke Association	The National Stroke Association is committed to educating patients, healthcare professionals, and the public, advocating for patients' needs, and advancing research aimed at improving stroke prevention, treatment, and recovery. (Sroberts, 2023)
American Stroke Foundation	The organization is dedicated to empowering stroke survivors and their families, helping them navigate life after stroke. Their mission is to

	provide education, support, and a nurturing environment that promotes physical, emotional, and educational growth, fostering hope and a fulfilling life post-stroke across America. They emphasize integrity and mutual respect in all their actions. (American Stroke Foundation, 2023)

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