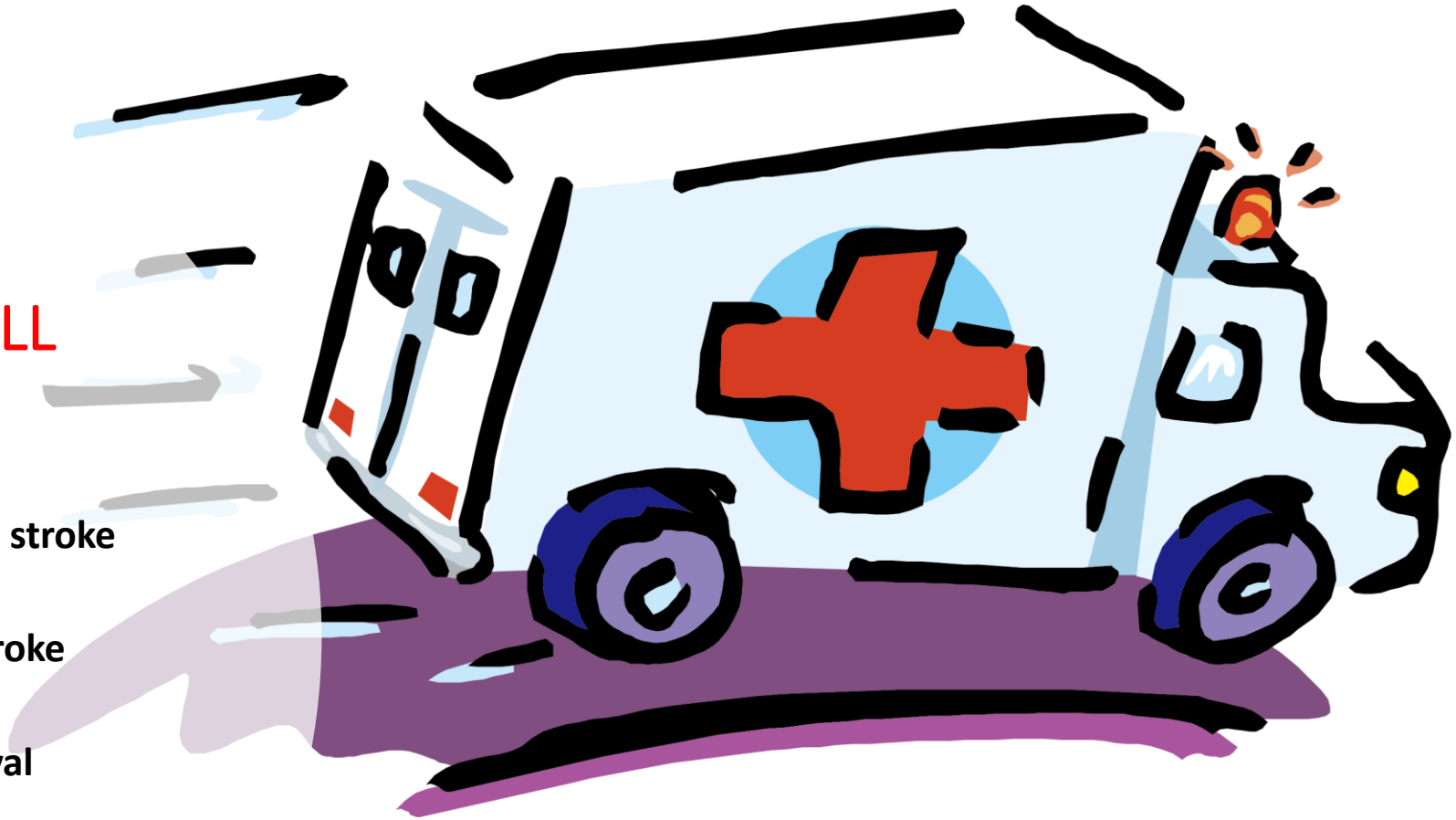
EMS FOR STROKE

EMS: THE FIRST LINE OF DEFENSE

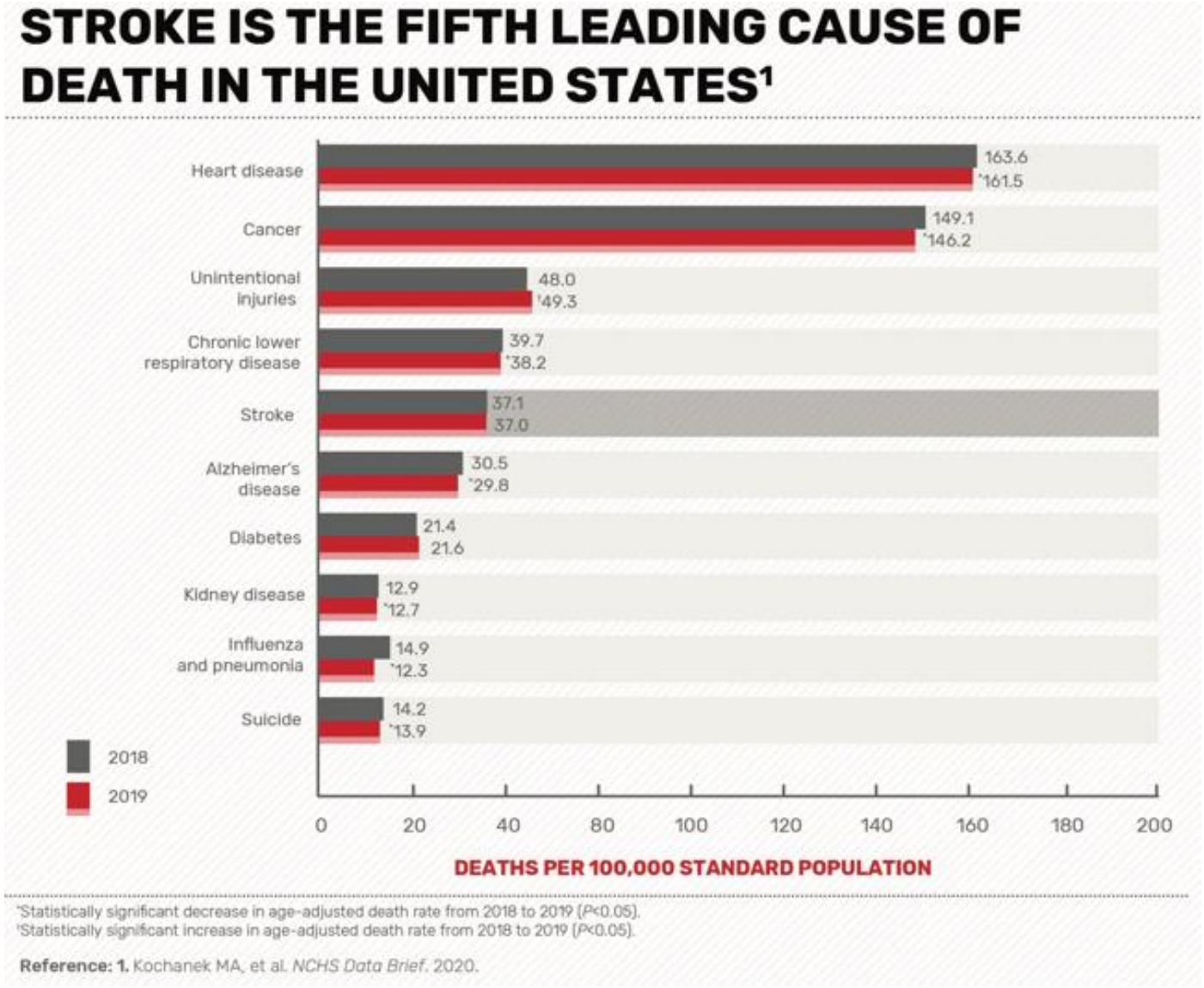
AT THE END OF THIS PRESENTATION, YOU WILL BE ABLE TO:

- **Describe the importance of recognizing stroke urgently and acting quickly**
- **Detail the role of EMS in prehospital stroke management**
- **Describe the importance of timely arrival**
- **Describe the impact of stroke disability on patients and their families**



UNDERSTANDING STROKE: A major cause of morbidity and mortality in the United States!

STROKE: THE 5TH LEADING CAUSE OF DEATH IN THE UNITED STATES



RISK FACTORS:

Stroke can happen to anyone, regardless of race, sex, or age. One in 5 strokes occur in individuals under 55 years of age, and that proportion is increasing.

Certain factors and medical conditions have been associated with increased risk:

- For Black patients aged 45-54, the risk of acute ischemic stroke (AIS) is 4 times that of White patients
- Individuals who smoke or are obese have a greater risk for stroke
- The lifetime risk of stroke is higher for women than for men. Among individuals 55-75 years, lifetime stroke risk is 1 in 5 for women, and 1 in 6 for men.
- Individuals are at a higher risk for AIS if they have comorbidities that affect the circulatory system
    - Hypertension
    - High cholesterol
    - Atrial fibrillation
    - Diabetes

ALARMING FACTS:

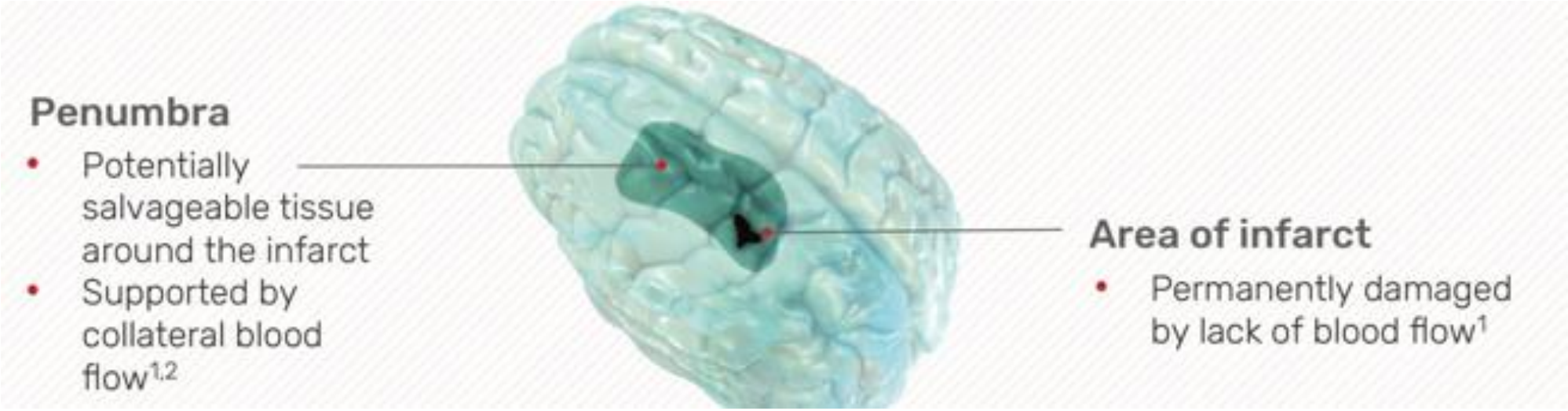
- Each year, approximately 55,000 more women than men have a stroke
- In 2018, 84,966 women and 62,844 men died due to stroke
- The AIS hospitalization rate in people under 65 has increased over time
- The number of people 18-64 years old who have had a stroke has increased over time
- Black patients have more than double the incidence of first ischemic stroke compared to White patients and are more likely to die from stroke than any other racial/ethnic group
- Hispanic patients have a high incidence of first stroke compared with White patients

TYPES OF STROKE

ISCHEMIC: Fatty plaque or a clot blocks blood flow, starving cells of oxygen (87% of strokes)

HEMORRHAGIC: A blood vessel leaks or breaks (13% of strokes)

Management varies depending on both the severity and the type



GOAL FOR ISCHEMIC STROKE: SAVE THE PENUMBRA

The penumbra is an area of potentially salvageable tissue beyond the blood-starved infarct

Over time, the infarct expands in the penumbra, increasing the area of irreversible brain damage

The average stroke patient can lose over a million neurons in the brain every minute “TIME IS BRAIN”

KNOW YOUR ROLE

EMS PLAYS A CRITICAL ROLE IN EARLY STROKE CARE

Stroke patients who use EMS services can benefit from:

- Earlier arrival to the ED
- Quicker evaluation in the ED
- More rapid treatment
- Greater likelihood of receiving reperfusion treatment (if eligible)

Only 60% of stroke patients call 911/use EMS

- Men and the Black and Hispanic communities are less likely to use EMS

EMS MANAGEMENT OF ACUTE STROKE: ON SCENE

- Manage CABs: give oxygen if needed
- Obtain blood glucose level
- Perform prehospital stroke assessment (BEFAST, SNO) *
- Establish and record exact time patient was last seen normal
- If possible, bring a witness to the hospital; alternatively, get the name and cell phone number of the witness
- Medical history: *
  - Identify current medications taken by patient, especially any antiplatelet or anticoagulant medications: (ASA, warfarin, etc)
  - Record recent illnesses, surgery, or trauma and any history of stroke, drug abuse, migraine, infection

PREHOSPITAL STROKE ASSESSMENT

LVO (Large Vessel Occlusion)

Think SNO

S: Speech (expressive aphasia – unable to speak)

N: Neglect (one side of the world does not exist for the patient)

O: Ocular deviation (eye gaze deviation to one side only, and not able to look past the midline to the other side)

COMMON STROKE SYMPTOMS

Common stroke symptoms

Right Hemispheric Stroke

- Slurred speech - dysarthria
- Weakness or numbness of left face, arm or leg
- Left sided neglect
- Right gaze preference

Left Hemispheric Stroke

- Speech problems – what is being said or inability to get words out
- Problems with comprehension
- Weakness or numbness of right face, arm, or leg
- Left gaze preference

Brainstem Stroke Symptoms

- Nausea, vomiting or vertigo
- Speech problems
- Swallowing problems
- Abnormal eye movements
- Decreased consciousness
- Crossed findings

Intracerbral Hemorrhage

Intraparenchymal Hemorrhage

- Nausea and Vomiting
- Headache
- One Sided Weakness
- Decreased Consciousness

Subarachnoid Hemorrhage

- Worst Headache of Life
- Intolerance to Light
- Neck Stiffness or Pain

ANTERIOR “EASY”, POSTERIOR “DIFFICULT”

Common symptoms of anterior stroke

- Aphasia
- Disturbed consciousness
- Dysarthria
- Facial palsy
- Hemisensory deficits
- Homolateral motor deficit

Common symptoms of posterior stroke

Think of the 5 D’s

- Dizziness (accounts for 56% of cases)
- Diplopia: (double vision)
- Dysarthria: (slurred/slow speech that can be difficult to understand)
- Dysphagia: (difficulty swallowing)
- Dystaxia: (impaired balance or coordination)

Can also have nausea, vomiting, not able to balance sitting or standing

“Posterior” accounts for 20-25% of ALL ischemic strokes

ANTERIOR “EASY”, POSTERIOR “DIFFICULT”

NIHSS (National Institutes of Health Stroke Scale)

The NIHSS scoring system is heavily biased toward anterior circulation and left-hemisphere stroke

Cranial nerve signs and ataxia, typical of posterior circulation strokes, receive fewer points or are excluded entirely (HA, nausea, walking excluded)

Right-hemisphere strokes are often underestimated, as only 2 points are directed toward neglect, compared to 7 toward language

Due to this uneven scoring, it is therefore possible that, depending on the location of the infarct, some patients may have a low NIHSS score but still have persistent neurological deficits!

WHAT FUNCTION IS AT RISK?

BRAIN AREAS AND RELATED FUNCTIONS[1-5]

Clot location impacts symptoms based on associated neuroanatomy[3]

Frontal lobe[1,2]

- Control of mood, emotions, and thought
- Conveys emotion in speech, facial expressions, and gestures

Parietal lobe[1,2]

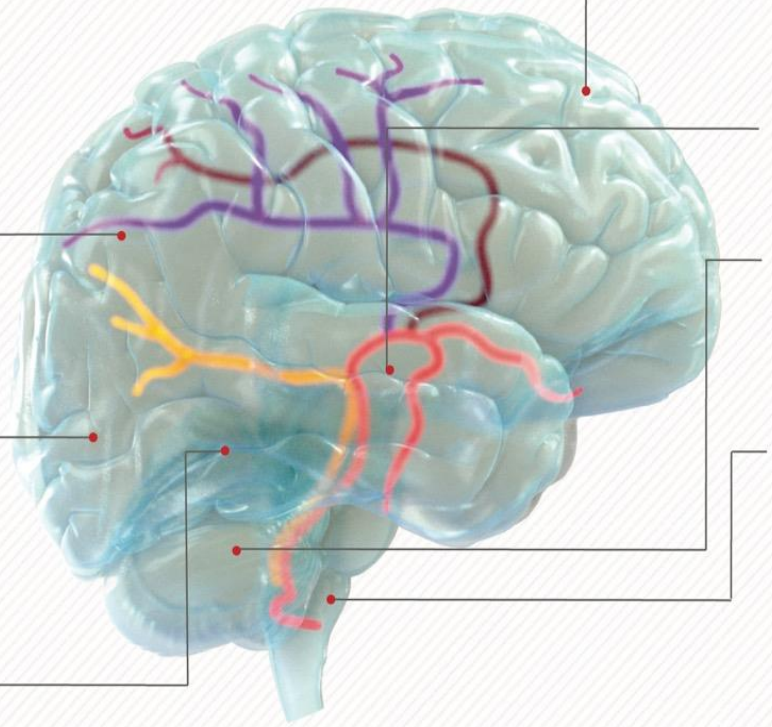
- Sensory perception

Occipital lobe[1]

- Occipitoparietal cortices mediate verbal and nonverbal material for immediate visual memory
- Occipitotemporal regions are used in object and facial recognition

Insula[1]

- Language processing and function



Temporal lobe[1,2]

- Emotional modulation of memories
- Fear conditioning
- May store long-term autobiographical memory

Cerebellum[1]

- Refines force and timing of movement
- Contributes to coordinated stepping

Brain stem[1,2,4,5]

- Balance and locomotion
  - Initiation and speed of locomotion
  - Postural tone
  - Modulation of muscle-generated force

Anterior cerebral artery (ACA)

Posterior cerebral artery (PCA)

Vertebrobasilar cerebral system

Middle cerebral artery (MCA)

References: 1. Goetz CG. *Textbook of Clinical Neurology*. 2007. **2.** Llinas R. *Stroke*. 2007. **3.** Martin-Schild S. *Ann Emerg Med*. 2001;42-45. **4.** MedlinePlus website. https:/medlineplus.gov/ency/imagepages/18007.htm. **5.** Snell RS. *Clinical Neuroanatomy*. 2010.

MEDICAL HISTORY

Conditions that may mimic stroke
Bell’s palsy
Complicated migraine
Conversion disorder/psychogenic conditions
Hypertensive encephalopathy
Hypoglycemia
Infection/abscess
Seizures
Tumor

MEDICAL HISTORY

Contraindications to Alteplase therapy: risk of bleeding is greater than the potential benefit

- Current intracranial hemorrhage
- Subarachnoid hemorrhage
- Active internal bleeding
- Recent (within 3 months) intracranial or intraspinal surgery or serious head trauma
- Presence of intracranial conditions that may increase the risk of bleeding (neoplasms, arteriovenous malformations, or aneurysms)
- Bleeding diathesis (plt count of <100,000, INR >1.7, aPTT >40 seconds, PT >15 seconds)
- History of warfarin use
- Received a treatment dose of low-molecular-weight heparin within the previous 24 hours
- Taking direct thrombin inhibitors or direct factor Xa inhibitors

EMS MANAGEMENT OF ACUTE STROKE

Prehospital notification:

- EMS personnel should provide prehospital notification to the receiving hospital that a suspected stroke patient is en route so that the appropriate hospital resources may be mobilized before patient arrival.

En route, EMS should inform the hospital of:

- Time of stroke symptom onset or time patient was last seen normal (LKWT)
- Patient's medical history
- Current glucose level
- Medication patient is currently taking

CARE EN ROUTE CONTINUED

1

Provide supplemental oxygen to maintain oxygen saturation >94%

2

Monitor blood pressure. Do not treat unless advised by medical control : (tPA can be started with a BP of 185/110, and while infusing needs to be <180/105)

3

Check and record blood glucose to assess for hypoglycemia and manage appropriately. DO NOT administer dextrose in non-hypoglycemic patients

4

Establish cardiac monitoring and intravenous (IV) access if possible

STROKE IS ONE OF THE LEADING CAUSES OF LONG-TERM DISABILITY IN THE UNITED STATES

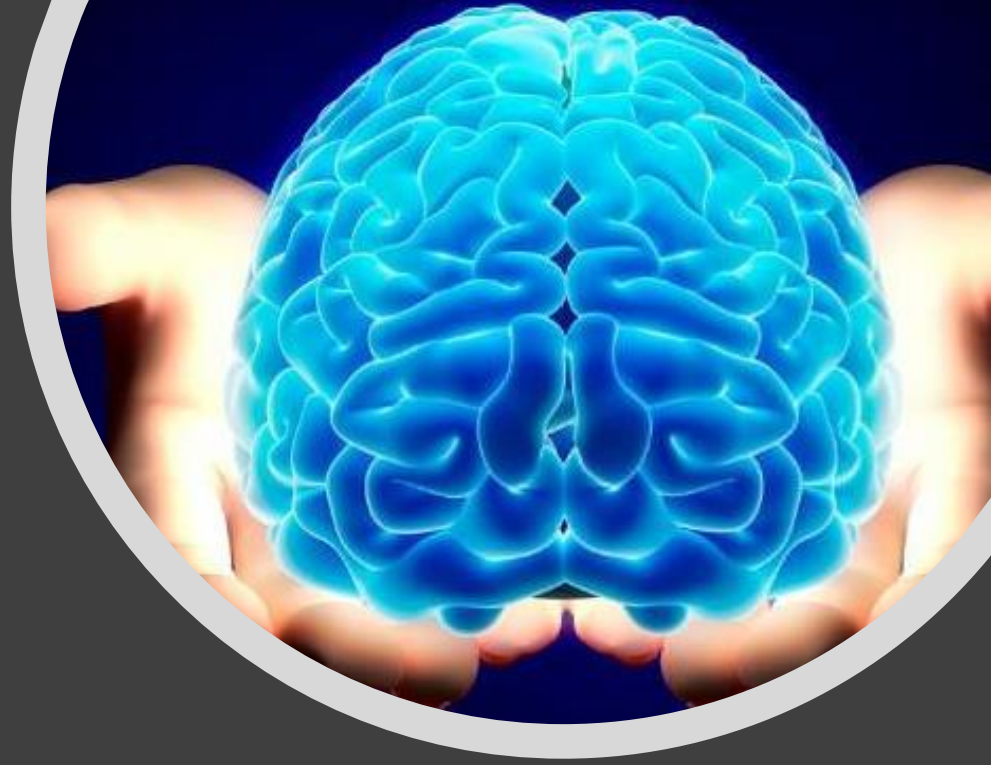
"Disability is defined as a "yes" response to at least 1 of the following":

- Use of an assistive device (cane, crutches, walker, or wheelchair"
- Difficulty performing activities of daily living (ADLs)
- Limitation in the ability to work around the house or at a job/business

IN SUMMARY…

- Stroke is the 5th leading cause of death in the US
- Approximately 87% of strokes are ischemic; 13% are hemorrhagic
- Stroke is a major cause of morbidity and mortality in the US
- Prehospital notification and acquisition of history of event, is critical
- Stroke deficits can lead to disability and can have long-term impacts on both the patient and caregiver
- Less than half of 911 calls for stroke are made within the first hour of symptom onset

EMS Recognition



Quarter 1: (ALMC) Elkhorn EMS team: DTN 33 minutes

Quarter 2: (ALMC) Lake Geneva EMS team: DTN 28 minutes

Quarter 3: none

Quarter 4: (ALMC) Medix: DTN 29 minutes

(AMCB) Waterford: DTN 22 minutes

EMS MAKES A DIFFERENCE: THANK YOU FOR ALL YOU DO!