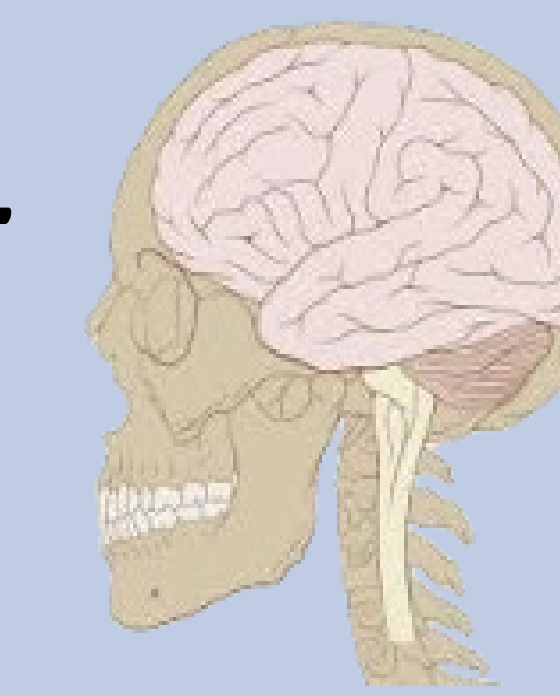


S36 Intracranial Hemorrhage- *Diagnosis and Treatment*



Objectives:

- Define an intracranial hemorrhage and how it is diagnosed
- Describe treatment associated with intracranial hemorrhages

What is an Intracranial hemorrhage?

- An intracranial hemorrhage (or brain bleed) is when there is bleeding present inside and around the brain's surface
- Bleeding can happen between the skull and brain tissue or within the brain's tissue itself preventing the brain from receiving oxygen

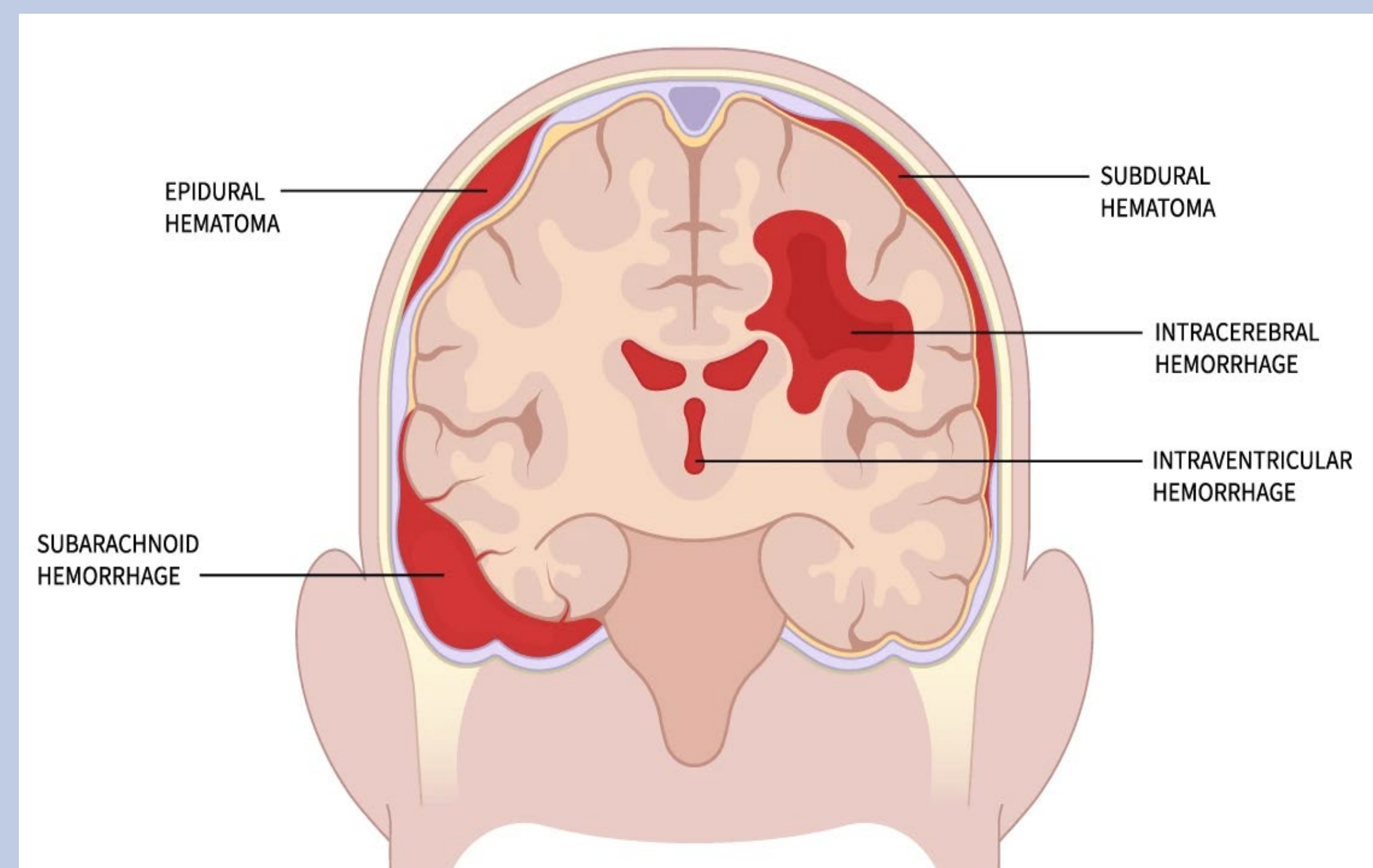
Types of Intracranial Hemorrhage:

Within skull but outside brain tissue:

- **Epidural bleed-**
Between the skull bone and dura mater
(**Outer**)
- **Subdural bleed -**
Between the dura mater and arachnoid membrane
(**Middle**)
- **Subarachnoid bleed-**
Between the arachnoid membrane and pia mater
(**Inner**)

Inside brain tissue:

- **Intracerebral hemorrhage-**
Occurs in the **lobes, brainstem** and **cerebellum**
- **Intraventricular hemorrhage-**
Occurs in brain **ventricles**



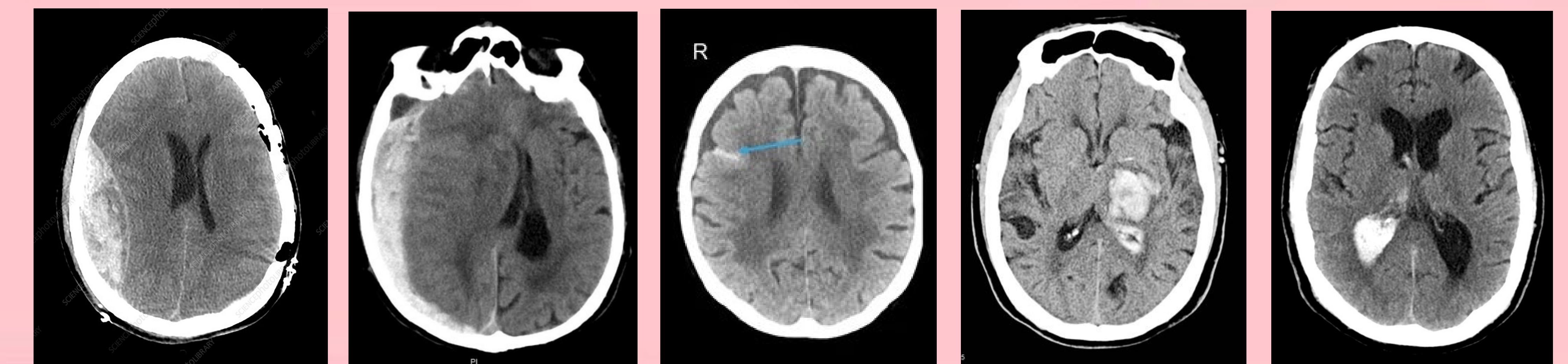
Diagnosing Brain Bleeds Computed Tomography (CT) and Magnetic Resonance Imaging (MRI):

CT: →

- **Volume-** of a hemorrhage can be measured using 3D volumetric software (hematomas with a **volume > 30 mL** are more prone to expansion)
- **Shape-** Hemorrhages with irregular shapes are more prone to expansion
- **Density-** the presence of **hypodense** or **isodense** regions that represent active bleeding (**swirl sign**)

MRI: →

- **Phase and Age-** signal characteristics on T1 and T2-weighted pulse sequences show subacute and chronic blood (**bloom sign**)
- **Areas of restricted blood flow-** diffusion-weighted imaging (DWI) assess tissue's structure by measuring how easily water can diffuse
- **Cause-** differentiate between arterial and venous hemorrhage



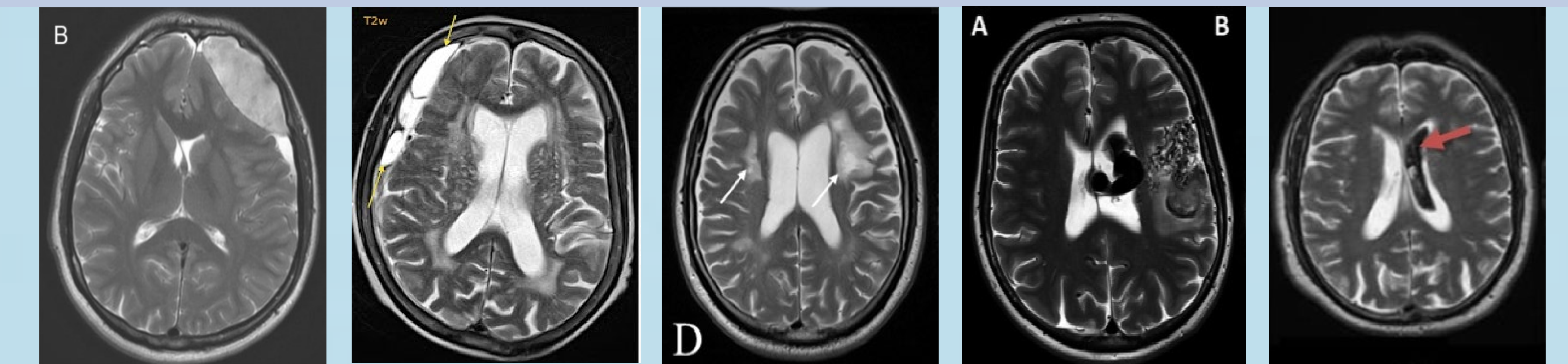
Epidural

Subdural

Subarachnoid

Intracerebral

Intraventricular



Treatment

Surgeries: The primary goal for this form of treatment is to stop bleeding as well as manage the cause, such as:

- **Decompression:** A hole drilled into the skull to drain blood and relieve pressure
- **Craniectomy:** Removal of a piece of the skull to relieve pressure
- **Craniotomy:** Removal and replacement of a piece of the skull to manage the source of bleeding

Medications: Another aspect of treatment is to treat the symptoms, the underlying cause, or prevent complications of a brain bleed, such as:

- **Anti-anxiety** medications
- **Antiseizure** medications
- **Blood pressure** management medications
- **Pain relief** medications
- **Corticosteroid** medications

How Do We Know Someone is More Susceptible?

- **Hypertension:** Chronic high blood pressure causes changes to arteries in the brain which can make them more likely to rupture
- **Age:** More common after the age of 55 (buildup of protein in walls of arteries called amyloid angiopathy)
- **Gender:** More common in men than women
- **Race:** Affects African Americans and Asians more highly (likely related to higher prevalence of hypertension)
- **Previous history** of stroke increases risk 23 times
- **Alcohol use and street drugs:** cocaine and amphetamines increase risk

IMMEDIATE INTERVENTION CAN LIMIT DAMAGE TO THE BRAIN AND IMPROVE ODDS OF RECOVERY!