



# Traumatic Brain Injury

---



# Do you know?

---

- How many people in Tennessee suffer a traumatic brain injury each year?



# Do you know?

---

- What is the number one cause of traumatic brain injury?



# Do you know?

---

- What age is the brain fully developed?



# Definition

---

- An acquired injury to the brain caused by an external physical force resulting in total or partial disability or impairment.



# Acquired Brain Injury (ABI)

Any injury to the brain occurring after birth.

## Traumatic Brain Injury (TBI)

Injuries occurring From external force

Oxygen Deprivation

Infectious Disease

Chemical or Substance Exposure

Stroke or Tumor



# National Statistics

---

- 1.4 million per year in US
- 1.1 million are treated in ER and released
- 235,000 are hospitalized
- 50,000 die



# Tennessee Statistics

---

- Approximately 8,000 annually
- Approximately 800 die
- Estimated that 26,000 are treated and released

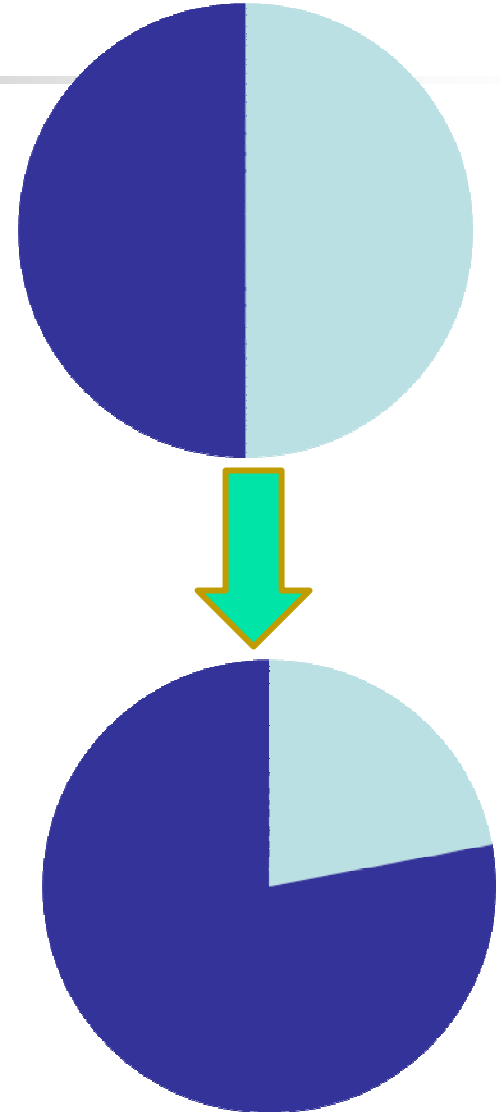
# Changes Over the Years

**30 years ago –**

**Only 50% of those  
with a TBI  
survived.**

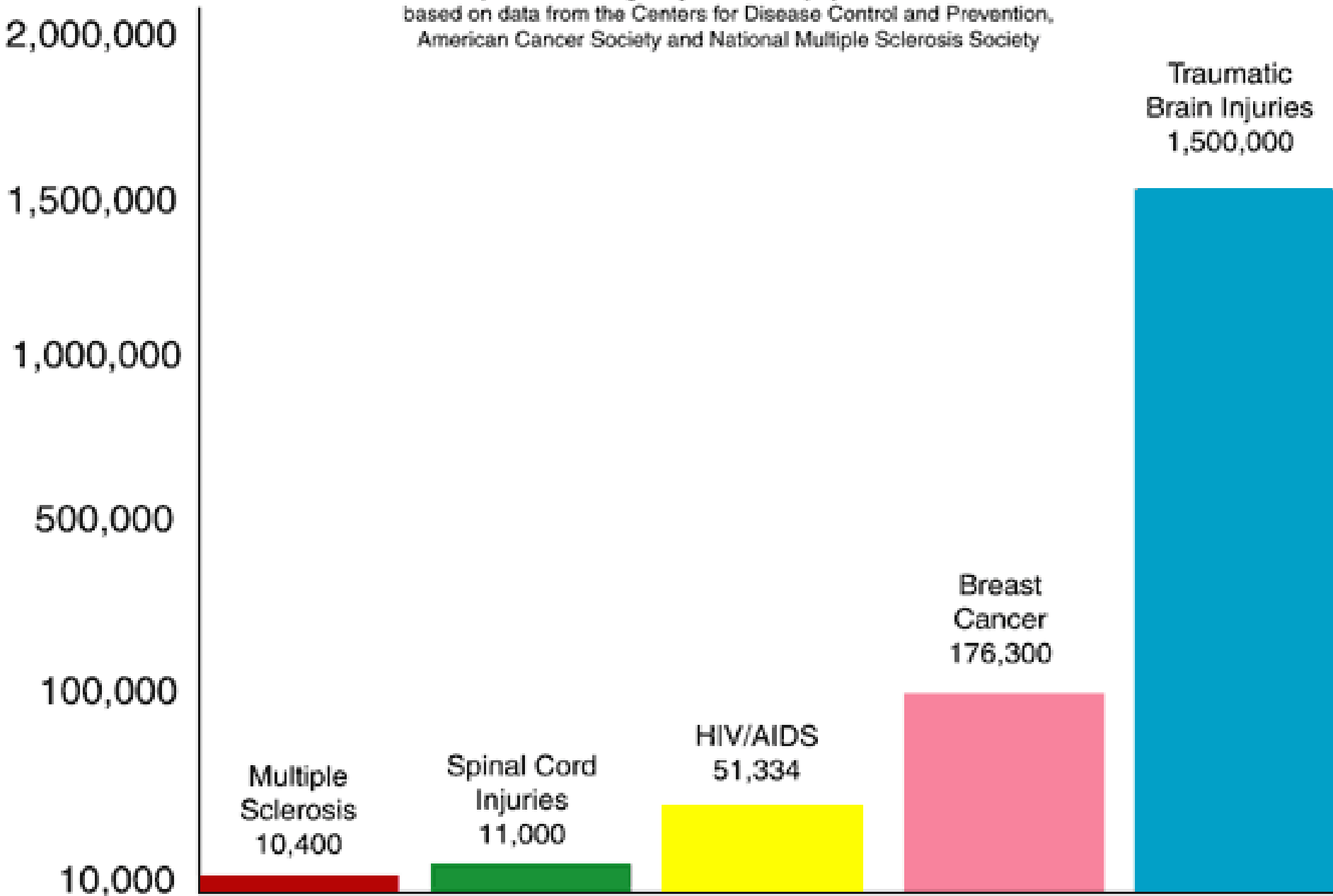
**Today –**

**78% survive a TBI.**

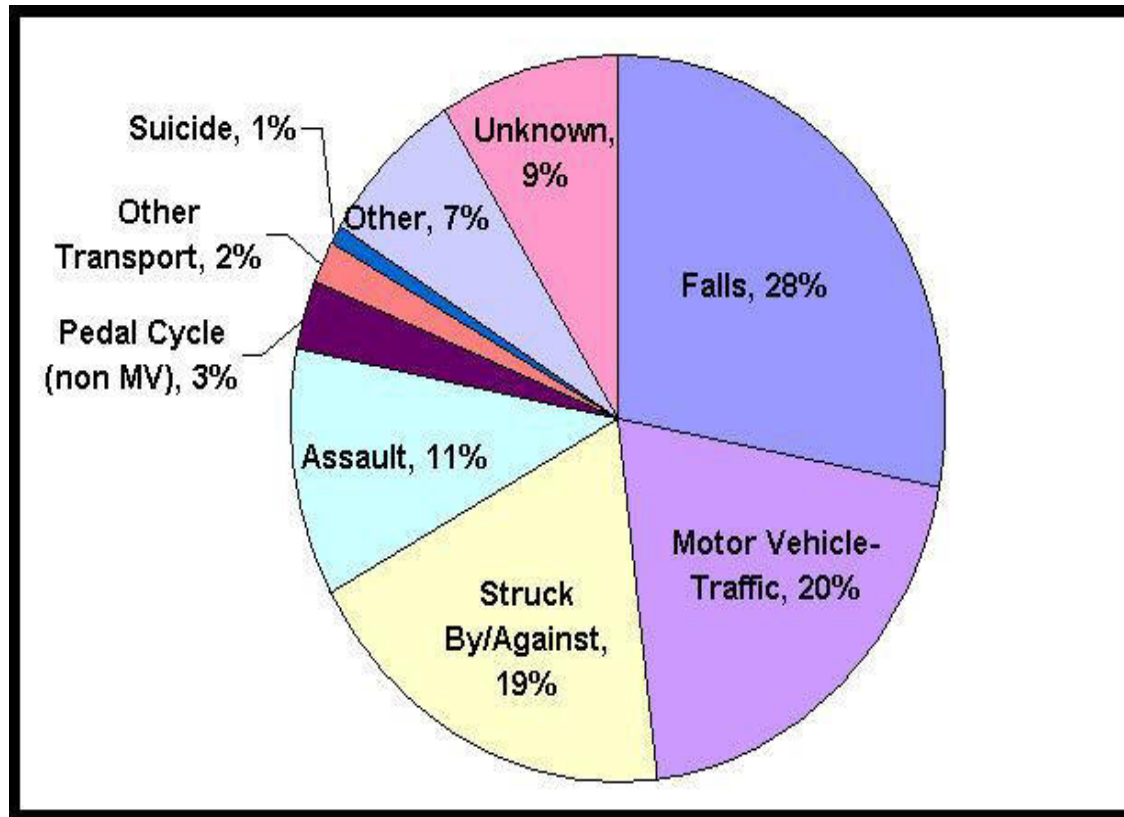


# Comparison of Annual Incidence

Data compiled and arranged by the Brain Injury Association of America based on data from the Centers for Disease Control and Prevention, American Cancer Society and National Multiple Sclerosis Society



# Causes of TBI





# Causes of TBI in Tennessee

---

- Falls 40%
- Motor Vehicle Accidents 38%
- Violent Injuries 9%
- Motor Vehicle – non traffic (ATV) 5%
- Bicycle Accidents 2%
- Other 6%

Data is from January – June of 2008



# Injury Severity

---

- Injuries are classified according to mild, moderate and severe injuries.
  - 80% are mild
  - 10-30% are moderate
  - 5- 25% are severe
- **Concussion:** mild TBI that often goes undiagnosed as such

# Severity of Injury

Severity	GCS	LOC	PTA
Mild	13–15	<20 min-1 hr	<24 hr
Moderate	9–12	1 – 24 hrs.	> 24 hrs. - <7days
Severe	3–8	>24 hrs.	>7 days

GCS = Glasgow Coma Scale

LOC = Loss of consciousness

PTA = Posttraumatic amnesia



## Glasgow Coma Scale for Head Injury

### **Glasgow Coma Scale, Eye opening**

Spontaneous	4
To loud voice	3
To pain	2
None	1

### **Verbal response**

Oriented	5
Confused, disoriented	4
Inappropriate words	3
Incomprehensible sounds	2
None	1

### **Best motor response**

Obeys	6
Localizes	5
Withdraws (flexion)	4
Abnormal flexion posturing	3
Extension posturing	2
None	1



# Consequences

---

- Consequences vary depending on severity and part of the brain injured

# Simplified Brain-Behavior Relationships

## FRONTAL LOBE

- Initiation
- Problem - Solving
- Judgment
- Inhibition of behavior
- Planning/Anticipation
- Self-Monitoring
- Motor planning
- Personality/Emotions
- Awareness of abilities/limitations
- Organization
- Attention/Concentration
- Mental flexibility
- Speaking (expressive language)

## TEMPORAL LOBE

- Memory
- Hearing
- Understanding language (receptive language)
- Organization and sequencing

## PARIETAL LOBE

- Sense of touch
- Differentiation: Size, Shape, Color
- Spatial perception
- Visual perception

## OCCIPITAL LOBE

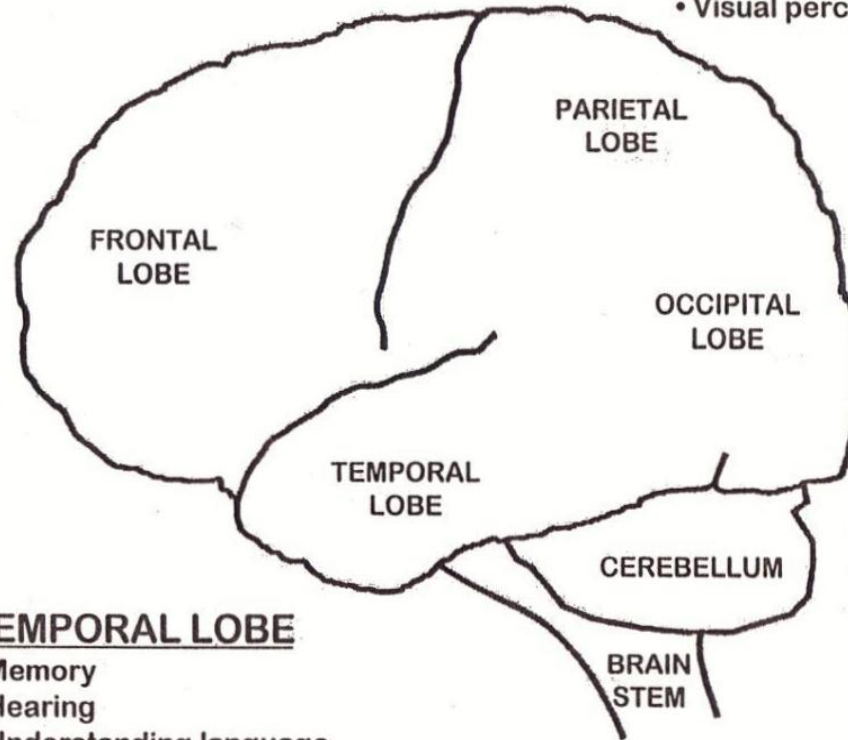
- Vision

## CEREBELLUM

- Balance
- Coordination
- Skilled motor activity

## BRAIN STEM

- Breathing
- Heart rate
- Arousal/Consciousness
- Sleep/Wake functions
- Attention/Concentration





# Frontal Lobe

---

- Located right under the forehead
- Involved in:
  - Consciousness of environment
  - Executive functioning and judgment
  - Controlling Emotions
  - Language usage
  - Personality



# Common Tests for Frontal Lobe Function

---

- Wisconsin Card Sort Test
- Finger Tapping Test



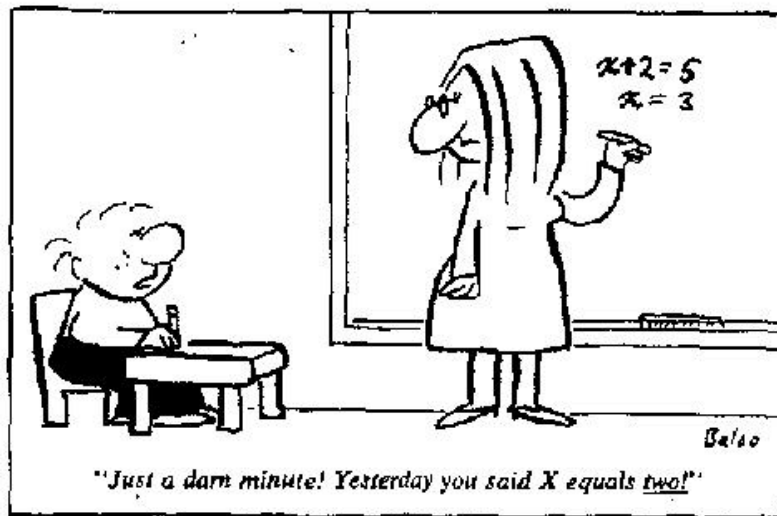
# Parietal Lobe

---

- Difficulty naming objects (Anomia)
- Difficulty writing words (Agraphia)
- Inability to attend to more than one object at a time
- Problems with reading (Alexia)
- Poor hand/eye coordination

# Parietal Lobe

- Spatial Perception
- Difficulty performing math calculations





# Common Tests for Parietal Lobe Function

---

- Kimura Box Test
- Two-Point Discrimination Test



# Temporal Lobe

---

- Difficulty remembering names and faces
- Difficulty understanding spoken words
- Difficulty with identification of objects
- Memory loss
- Aggressive behavior
- Persistent talking



# Common Tests for Temporal Lobe Function

---

- Rey-Complex Figure Test
- Wechsler Memory Scale



# Occipital Lobe

---

- Visual defects
- Difficulty recognizing colors
- Hallucinations
- Visual illusions
  - inaccurately seeing objects
- Word blindness
  - inability to recognize words



# Cerebellum

---

- Injury can cause problems with coordination, fine motor movements and balance.
- Eye/Hand Coordination
  - May not be able to reach out and pick up a glass
  - May not be able to brush teeth
- A person with a damaged cerebellum may look “drunk” when they walk.
  - May need support when walking



# Brain Injury In Children

---

- MYTH: Younger children are more resilient and can therefore “bounce back” easier and more quickly from a brain injury.
- REALITY: It may just take longer for the effects of a brain injury to show up in a growing and developing brain, but children can develop these same consequences as adults.



# Common Signs of TBI in Children

---

- Headaches
- Balance Problems
- Sensory Changes (changes in taste, smell, or appetite)
- Sleep Problems
- Changes in personality
- Trouble remembering things



# Shaken Baby Syndrome

---

- Caused by vigorously shaking an infant
- Average age of victims is between 3 and 8 months of age



# Symptoms

---

- lethargy
- irritability
- vomiting
- decreased appetite
- lack of smiling or vocalizing
- rigidity
- seizures
- difficulty breathing
- altered consciousness
- unequal pupil size
- an inability to lift the head
- an inability to focus the eyes or track movement



# What to look for

---

If shaken baby syndrome *is* suspected, doctors may look for:

- hemorrhages in the retinas of the eyes
- skull fractures
- swelling of the brain
- subdural hematomas (blood collections pressing on the surface of the brain)
- rib and long bone (bones in the arms and legs) fractures
- bruises around the head, neck, or chest



# Effects of Shaken Baby Syndrome

---

- partial or total blindness
- hearing loss
- seizures
- impaired intellect
- speech and learning difficulties
- problems with memory and attention



# Issues facing TBI survivors

---

- Lack of medical care
  - No insurance or insurance does not cover all needs
  - No transportation to appointments
  - Often survivors do not know what medical personnel to go to



# Issues, cont.

---

- Mental health / Substance Abuse issues
  - Issues such as depression, anxiety, substance abuse, and post traumatic stress disorder are common after a brain injury
  - Many professionals do not have training in brain injury
  - Treatment is often unsuccessful when survivors of brain injury are treated by professionals that are not sensitive to the unique issues they face



# Issues, cont.

---

## Identification of TBI survivors

- Services for TBI survivors are sometimes hard to obtain because they don't look injured
- Sometimes society does not believe there is anything wrong with someone that doesn't appear injured



# Resources for TBI Survivors

---

- Tennessee State Health Department's Traumatic Brain Injury Program provides:
  - Education
  - Information and referrals
  - Camp for survivors
  - Therapeutic Recreation Program
  - Case management services
  - Support groups



# Funding for TBI Program

---

- Dedicated funding stream
- Five traffic violations (speeding, DUI, reckless driving, driving w/o a valid license and hit and run causing bodily injury)
- Trust fund
  - collects \$1,000,000 per year
- Budget for staff and grants



# Education

---

- Distance learning is offered biannually
- Lunch time training sessions offered throughout Tennessee
- Health Educator is available to provide training and present at conferences
- If you would like to be notified about future distance learning conferences, please email [Rachel.Heitmann@state.tn.us](mailto:Rachel.Heitmann@state.tn.us)



# Information and Referral

---

- The TBI Information Clearinghouse consists of articles, books, videos and pamphlets.
- A toll free number has been set up to provide information
- Examples of information provided include referrals to rehabilitation facilities, information on day programs, respite care, transportation and financial issues.



## Information, cont.

---

- Resource Directory
- Newsletter



# Service Coordination

---

- Eight service coordinators throughout Tennessee
- Service Coordinators are located in Nashville, Chattanooga, Memphis, Shelbyville, Cookeville, Knoxville, Jackson and Johnson City
- Services provided:
  - Provide information on TBI
  - Refer consumers to services available
  - Assist consumers in applying for and accessing services
  - Support group development



# Accomplishments of Service Coordinators

---

- Assisted clients in applying for TennCare and appealing denials
- Assisted Client with locating free dental care
- Assisted a survivor in transferring to a hospital closer to family
- Assisted a client in seeing a physician free of charge



# Service Coordinators

---

- Attended two Social Security Disability hearings and acted as a witness for the clients. Both clients were subsequently approved for disability
- Assisted two clients in obtaining eye exams and glasses through the Lion's club
- Worked with an area nursing home to get repairs on a client's wheelchair
- Obtained a scholarship for one client to attend the local YMCA



---

# **Traumatic Brain Injury Program**

**1-800-882-0611**