

# Traumatic Brain Injury and Veterans



## Presenter Information and/or Additional Information

Supported in part by ALH21MC06738 from the Department of Health and Human Services Health Resources and Services Administration, Maternal and Child Health Bureau. The contents are the sole responsibility of the authors and do not necessarily represent the official views of DHHS.

# Traumatic Brain Injury (TBI) Defined<sup>4</sup>

TBI: “an alteration in brain function, or other evidence of brain pathology, caused by an external force”

(Strokes, aneurisms, etc.  
are examples of internal trauma)

Closed TBI: brain is damaged without penetrating skull  
(Most common & results from falls, car accidents, assault, etc.)

Open TBI: skull penetrated by an external object  
(i.e. gun shot wound)

# Traumatic Brain Injury is...

- Injury to the head from a blunt or penetrating object
- Injury from rapid movement of the head that causes back and forth movement inside the skull

# Mild TBI/Concussion

## Facts

- Defined as a period of altered mental state or a brief loss of consciousness (LOC) following a blow to the head
- 80-85% of all TBIs are mild
- Often is undiagnosed, misdiagnosed
- Family and individual are seldom followed by medical community or receives education in the ER

## Common Symptoms

- May or may not lose consciousness
- Headaches
- Dizziness
- Slowed processing
- Forgetfulness
- Fatigue
- Sensitivity to noise and lights
- Altered sleep pattern

# Moderate TBI

- LOC can last from minutes to hours
- May have tissue damage, bleeding or fractures in skull
- Symptoms may include loss of recall of the event, confusion, and impaired verbal memory

# Severe TBI

- LOC for 6 or more hours
- Long –Term disability is highly likely
- Behavior, social, and communication impairments may result

- 
- 15-20% of TBIs are moderate to severe in nature
  - Documented loss of consciousness
  - Potential skull fractures
  - Significant period (days to weeks) of coma
  - Significant loss of information for a period of time post event
  - Significant and chronic thinking, physical and emotional changes



# Mechanism of Damage

- Brain Consistency: Baby= Pudding; Adult = “Jell-O”
- Bruising of the brain due to forward/backward movement against skull
- Twisting of nerve fibers due to twisting of brain within skull
- Nerve fibers are broken or stretched = temporary or permanent brain damage

# What happens when the brain is injured?

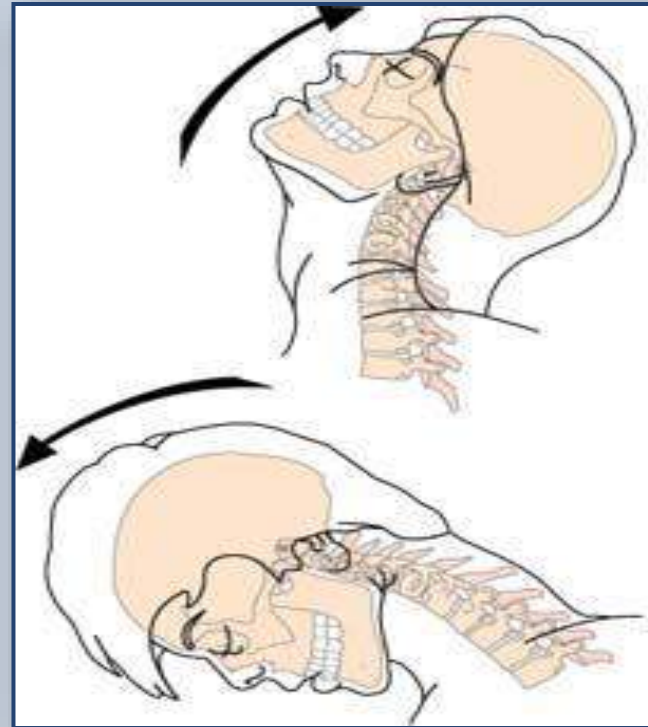
## Primary Injury

- Direct movement of the brain inside skull (slamming, rubbing, shearing)
- Penetrating object

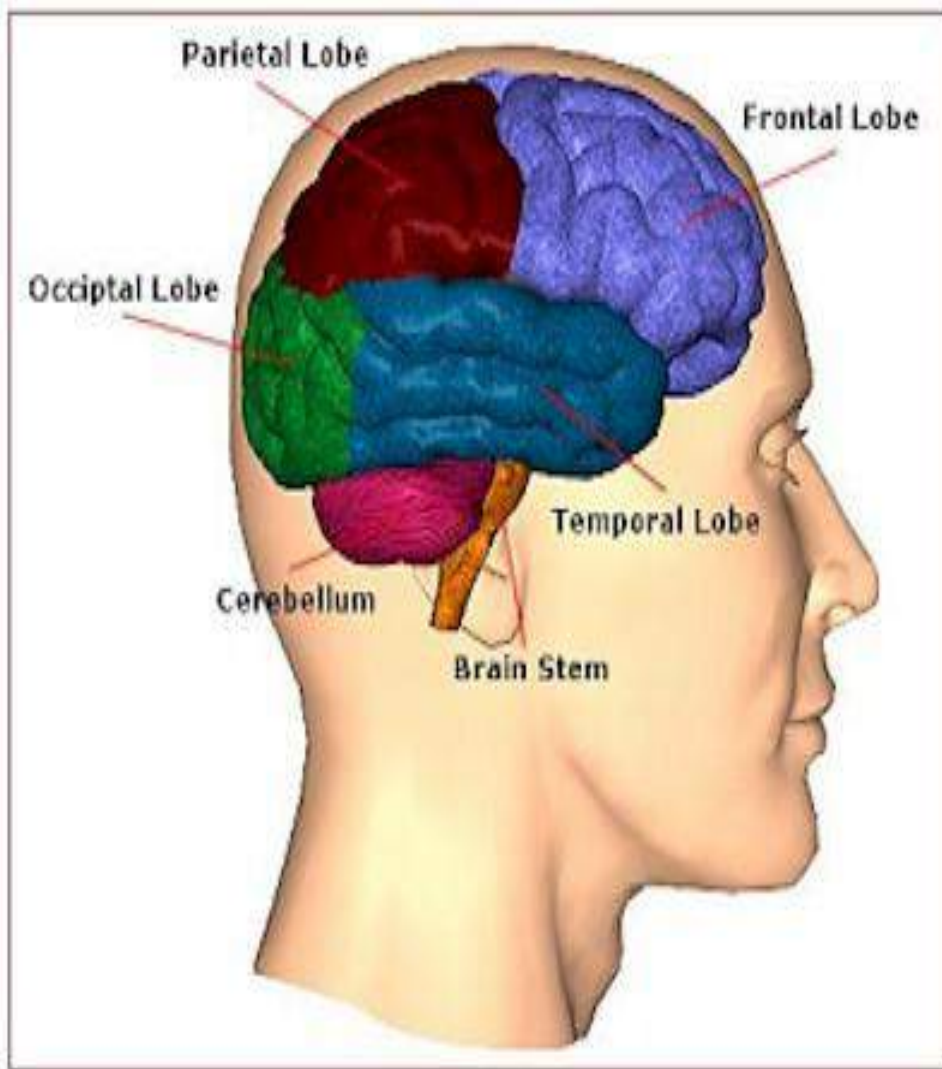
## Secondary Injury

- Bleeding over and within the brain tissue
- Swelling from fluid leakage (increased intracranial pressure)

- Ex. Diffuse Axonal Injury



# View of the Brain



**Frontal Lobe:**  
Executive Function  
(Attention, Judgment,  
Organization, etc.)

**Parietal Lobe:**  
Visual, Spatial Orientation

**Occipital Lobe:**  
Vision

**Temporal Lobe:**  
Hearing, Memory

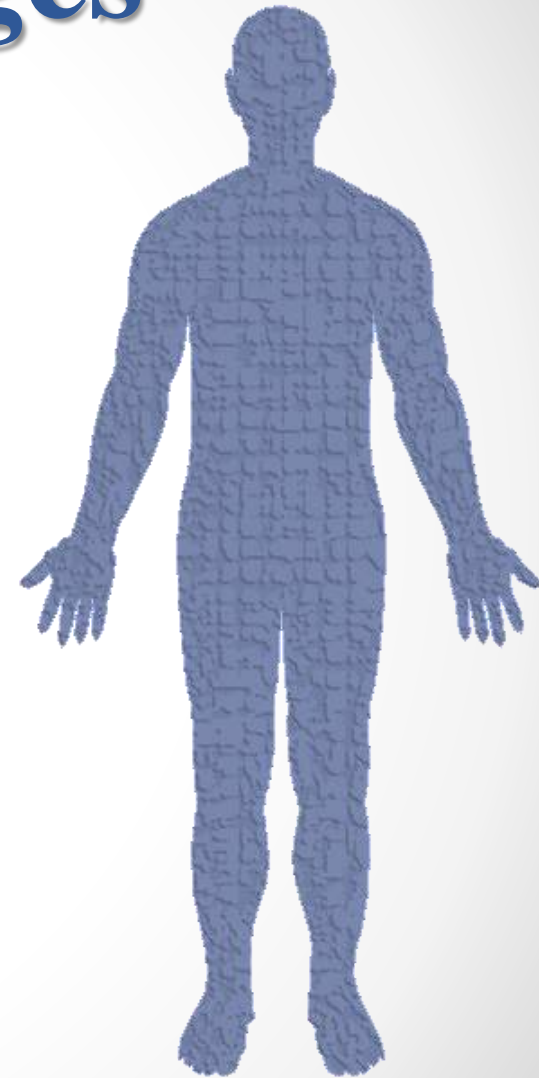
**Cerebellum:**  
Balance, Coordination

**Brain Stem:**  
Regulation, Consciousness,  
Involuntary Activities



# Physical Changes

- Headaches
- Changes in sleep patterns
- Fatigue
- Seizures
- Mobility – full body or partial
- Speech impairment
- Hearing (i.e. partial loss)
- Vision (i.e. blurred, loss of, light sensitivity, “double vision”,)
- Taste/Smell
- Poor Balance
- Impaired coordination

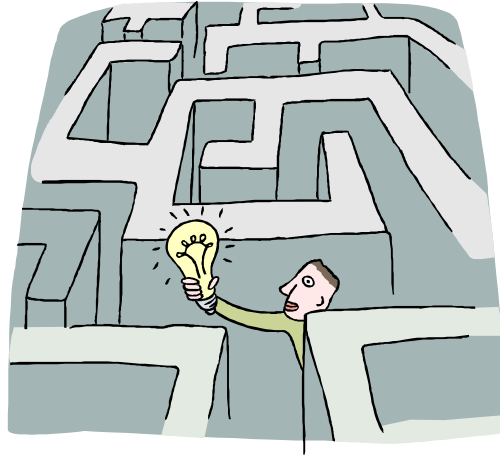


# Thinking Changes in “Executive Functioning”

Difficulty  
planning/setting goals

Difficulty problem  
solving

Problems being  
organized



Difficulty prioritizing

Difficulty  
being flexible

Decreased awareness of thinking  
changes in self

Problems with  
attention and  
concentration

# Emotional/Behavioral/Social Changes

Depression

Increased  
impulsivity

Anxiety

Rebellious

Difficulty with  
self -initiation

Impatience

Self-monitoring

Inability to get along  
with others



Socially  
inappropriate  
behavior

Intolerant

Increased self-focus

Irritability/  
agitation

Increased risk taking

Rapid loss of  
emotional control  
("short fuse")

Before-after  
contrasts

# Who is at risk?



Estimated  
1.7 million  
injuries  
annually<sup>1</sup>

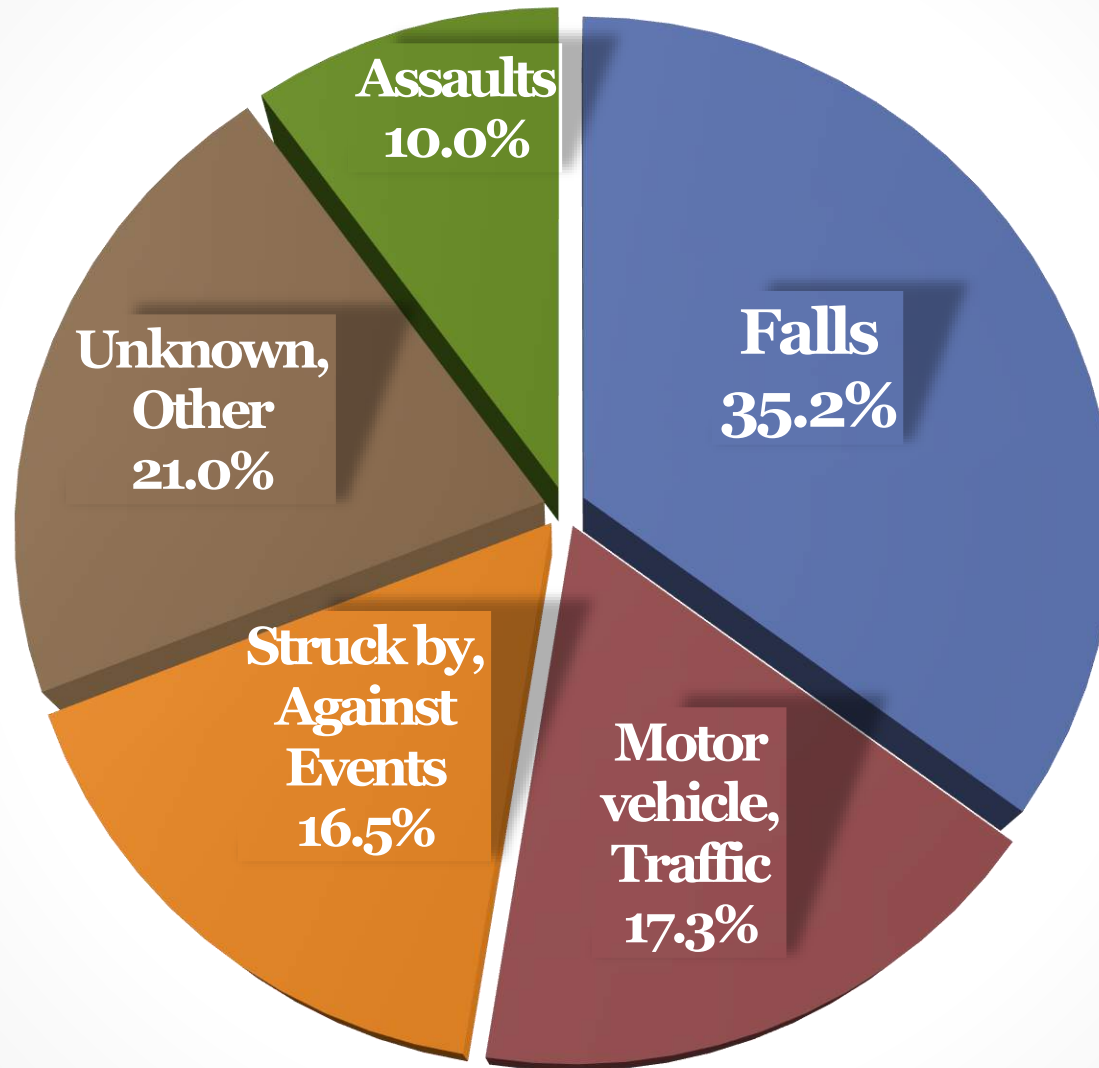
Ages most at  
risk:

0 to 4 years; 15  
to 19 years; and  
65 years and  
older<sup>1</sup>

Males have a  
higher incident  
rate (~75%) than  
females.<sup>3</sup>

After the 1<sup>st</sup> TBI, the risk of a 2<sup>nd</sup> TBI  
is 3 times greater. After a 2<sup>nd</sup> TBI, the  
risk of a third TBI is 8 times greater!

# Leading Causes of TBI <sup>1\*</sup>



\*Based of CDC's annual estimates from 2002-2006

# Traumatic Brain Injury Is **Not...**

- a new onset of a mental disorder.
- just emotional stress.
- an acquired mental retardation.
- the effects of prolonged drug/alcohol abuse.
- a gradual change in cognitive function.

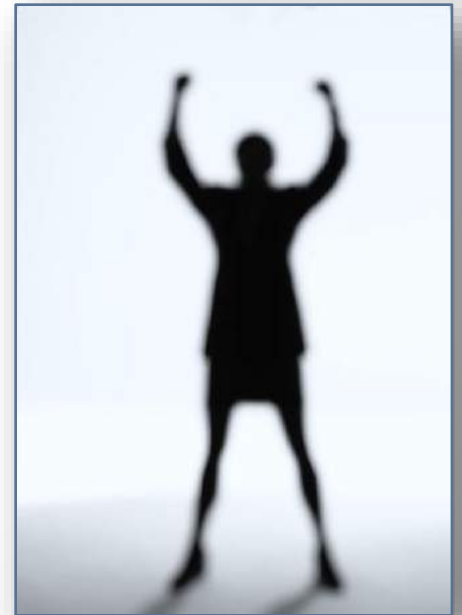
# An Individual With TBI...

- ✓ May be more difficult to engage.
- ✓ May show poorer follow-through on tasks.
- ✓ Likely to “not remember” prior discussions or routines.
- ✓ May have difficulty profiting from interventions provided.

- ✓ Is more likely to have difficulty adjusting to group living/shared responsibilities.
- ✓ May have greater behavioral control issues.
- ✓ May appear more confused, more inattentive and more fatigued than other residents.

# TBI changes can result in individuals ...

- ✓ Being inconsistent in their performance
- ✓ Having poor judgment and decision making abilities
- ✓ Having difficulty generalizing to new situations
- ✓ Lacking awareness of these difficulties
- ✓ Having difficulty remembering or learning new information





# Prevalence of TBI in the Military

- Prevalence of TBI for military members from 2000 to 2011 <sup>8</sup>:

- Penetrating – 3,738
- Severe – 2,360
- Moderate – 38,235
- Mild – 175,674
- Not classifiable - 9,099
- Total – 229,106

- \*\*\* *Non-combat and combat related-causes.*



- Why the increase of this “signature injury” in this war? <sup>9</sup>

1. Nature of combat
2. More people survive
  - Advancement in combat equipment
  - Advancements in combat medication and evacuation
3. Heightened awareness of TBI

- Service members are high risk:
  - Combat and related-activities
  - Physically demanding training
  - “exciting leisure activities” – motorcycling, sports, etc.
  - Demographics : males, ages 18 to 24
- Causes of TBI for service members:
  - Bullets, Fragments, Blasts
  - Falls
  - Motor vehicle injuries
  - Assaults
- Non-Combat Causes:
  - Motor vehicle accidents  
(private and military vehicles)
  - Falls
  - Sports and recreation
  - Military training

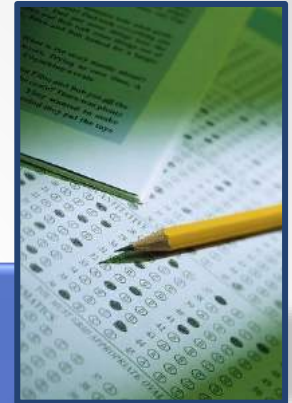
# Causes of TBI in the Military<sup>8</sup>



# Blast Injuries <sup>8</sup>

- Most common cause of TBI in the theater of combat
- Can result in mild, moderate and severe TBIs
- Categories of Blast Injuries:
  - Primary: exposure to pressurized wave produced by blast
  - Secondary: injury from objects displaced/thrown by blast
  - Tertiary: injury caused by individual being displaced/thrown by blast
    - Such as, injury caused by being thrown by blast against the wall or ground.
    - Acceleration/deceleration and blunt force trauma injuries
  - Quaternary: other injuries that resulted from blast, other than TBI
    - Burn, broken bone, hearing loss, ocular trauma
- “Road side bombs”/Improvised explosive devices (IEDs) create blast injuries in the wars in Iraq and Afghanistan.

# Screening for TBI in Veterans



- Basic screening questions in post-deployment assessment<sup>8</sup>:
  - Did an event occur that resulted in a blow to the head or exposure to a blast?
  - If so, did the event result in a change in consciousness?
  - Was the change of consciousness followed by symptoms such as headache, feeling tired, confusion, or memory loss after the event?
  - If so, which symptoms are present at the time of the screening?
- If positive answers are received for all four questions, further evaluation is conducted<sup>8</sup>.
- Can TBIs be undetected?
  - Service member may not attribute symptoms to a TBI-causing event (i.e.. a blast).
  - May be masked by other problems such as PTSD and post-deployment adjustment
  - Not all TBIs are identified by neuroimaging (CT or MRI scans)

# Returning to Duty<sup>8</sup>



Majority of service members with a mild TBI will recover with no lasting effects without specialized care.

For other service members a mild TBI/concussion may have lasting effects.

- should have a thorough medical evaluation.
- may be given a short period of restrictions to give the brain time to heal.

Returning to duty too soon can cause temporary worsening of symptoms.

Should be gradual and under the direction of a health care provider.

Considerations when planning to return-to-duty:

- Shortened workday
- Reduced tasks & responsibilities
- No driving
- No heights if experiencing dizziness or imbalance
- Allow for breaks when symptoms increase
- No heavy lifting/working with machinery

# Returning Home<sup>10</sup>



20% (~400,000) of returning Service Members report reintegration problems.

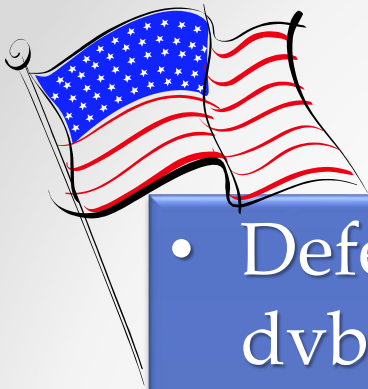
AfterDeployment.org: Supports for service members, families, and vets with post-deployment issues

## Post-deployment Issues:

- Returning to Duties
- Re-establishing Self “in new mission”
- Parenting and Children
- Recovery & Adjusting to Injury
- Family’s Adjustment Stresses
- Personal Relationships
- Substance Abuse

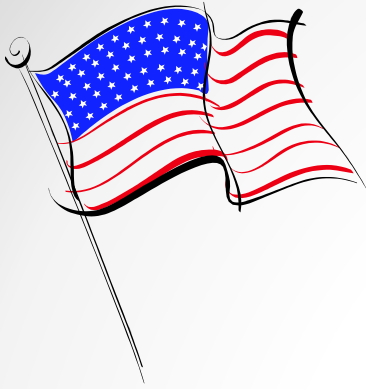
## Transitioning from Military

- Establishing a new support system
- Working as a Civilian
  - Job Match
  - Style of Work and Management Structure
- May evoke new stresses
- Rewards
- Vocational Assessment and Support Services



# Resources

- Defense and Veterans Brain Injury Center  
[dvbic.org](http://dvbic.org)
- Brain Injury Association of New York State:  
[BIANYS.org](http://BIANYS.org):
  - Documentary Films on Veterans and BI and other material
- [AmericasHeroesAtWork.gov](http://AmericasHeroesAtWork.gov):
  - “Supporting the Employment Success of Returning Service Members with TBI & PTSD”
- [TraumaticBrainInjuryAtoZ.org](http://TraumaticBrainInjuryAtoZ.org)
- [www.GiveAnHour.org](http://www.GiveAnHour.org):
  - Network of providers who donate one hour of counseling to service member/family/vet in a specialized area.



# Resources (Cont.)

## RealWarriors.net

Promotes help-seeking behavior, awareness, and using resources among service members and vets

## MilitaryOneSource.com

Free service from DoD to service members and families to help with a broad range of concerns

## ACP AdvisorNet:

Network of volunteer business experts that offer advice to veterans seeking civilian jobs

## Defense Centers of Excellence for Psychological Health and TBI:

[dcoe.health.mil](http://dcoe.health.mil)



## General Resources

### **Centers of Disease Control**

[www.cdc.gov/traumaticbraininjury](http://www.cdc.gov/traumaticbraininjury)

### **Brain Injury Association of America**

[www.biausa.org](http://www.biausa.org)

### **BrainLine.org**

### **BrainInjuryEducation.org**

University of Missouri TBI Guide

### **Lash and Associates Publishing**

[www.lapublishing.com](http://www.lapublishing.com)

### **TraumaticBrainInjuryAtoZ.org**

[www.tbiGuide.com](http://www.tbiGuide.com)

## Alabama Resources

### **UAB Model System**

[www.uab.edu/tbi](http://www.uab.edu/tbi)

### **Alabama Head Injury Foundation**

[www.AHIF.org](http://www.AHIF.org)

### **Alabama Department of Rehabilitation Services**

[www.rehab.alabama.gov/tbi](http://www.rehab.alabama.gov/tbi)

### **Mapping Access to Program Services**

[www.rehab.alabama.gov/maps](http://www.rehab.alabama.gov/maps)

### **Alabama Disabilities Advocacy Program**

[www.adap.net](http://www.adap.net)

# Core TBI Service System

---

- Alabama Head Injury Foundation
- Interactive Community-Based Model
- Vocational Rehabilitation Service
- Children's Rehabilitation Service



# Alabama Head Injury Foundation (AHIF)

...a state-wide non-profit with the mission to improve the quality of life for people who have survived traumatic brain injuries and for their families.

AHIF helps access available resources and provides services and programs which meet the unique needs of individuals with traumatic brain injury (TBI) as well as spinal cord injury (SCI) in certain programs.

## Programs include:

Resource Coordination, Respite Care, Housing Assistance, Information and Referral, Camp Program, Recreation Program, Advocacy, Recreational Support Groups, Car Seats for Kids, Neurobehavior Clinic

*For more information about AHIF, call 205-823-3818 or 800-433-8002, or email [AHIF1@bellsouth.net](mailto:AHIF1@bellsouth.net).*

# Interactive Community-Based Model (ICBM)

*A program within the Alabama Department of Rehabilitation Services*

...an interactive, criterion-based program designed to address employability, independence and community reintegration for individuals with TBI.

To qualify the individual must:

- be less than 2 years post-injury, which was a result of external force neurotrauma
- not be appropriate for traditional vocational rehabilitation services at the time of referral
- be able to benefit from a cognitive and behavioral rehabilitation program

Services may include:

Counseling and Guidance, Cognitive Remediation,  
TBI Education, Individual and Family Support,  
Case Management, Behavioral Program Development

*For more information about ICBM, call 205-290-4590 or 888-879-4706, or email [maria.crowley@rehab.alabama.gov](mailto:maria.crowley@rehab.alabama.gov).*

# Children's Rehabilitation Service (CRS)

*A division within the Alabama Department of Rehabilitation Services*

...to assist children and youth in transition from hospital to home, to school, and to the community.

## Eligibility:

Any child or adolescent younger than 21 years of age who is a resident of Alabama and has a special health care need.

## Services may include:

Information and Referral, Care Coordination, Treatment, Transportation Assistance, Community Education and Support, Evaluation and Assessment, Family Education

*For more information about CRS, Services,  
call 1-800-441-7607 (TTY 1-800-499-1816) or contact the CRS office in your  
area.*

*[www.rehab.alabama.gov](http://www.rehab.alabama.gov)*

# Vocational Rehabilitation Service (VRS)

*A division within the Alabama Department of Rehabilitation Services*

...provides services to eligible individuals with disabilities to improve opportunities for employment

To be eligible the individual must:

- Have a physical or mental disability that inhibits obtaining or maintaining employment
- Require vocational rehabilitation services in order to get or keep a job

\*Eligibility is presumed for recipients of SSI or SSDI who intend to achieve an employment outcome.

Services may include:

Counseling and Guidance, Evaluation, Training Services, Job Placement, Assistive Technology, Supported Employment, Postemployment Services

*For more information about VRS,  
call 1-800-441-7607 (TTY 1-800-499-1816) or contact the VRS office in your area.  
[www.rehab.alabama.gov](http://www.rehab.alabama.gov)*

# Alabama Statewide TBI Core System

- Includes AHIF; ADRS' CRS, ICBM, and VRS

Core Service Programs

Alabama Head Injury Task Force

Board of statewide leaders with an interest in improving care for individuals with TBI

- Facilitates Core system services and serves as last resort payer for costs of care for Alabamians with neurotrauma

Impaired Drivers Trust Fund and Advisory Board

Alabama Head and Spinal Cord Injury Registry

- Service linkage system containing all head and spinal cord trauma reported by hospitals statewide

# State of Alabama Independent Living (SAIL)

*A division within the Alabama Department of Rehabilitation Services*

...to enhance and promote independence in the home, community and workplace.

To be eligible a person must:

- have a severe disability that limits his or her ability to live independently
- provide evidence that by receiving this service, his or her potential to achieve independence will improve
- Demonstrate financial need

*For more information about Independent Living Support Services, call 800-441-7607 (TTY 800-499-1816) or contact the SAIL office in your area.*

*[www.rehab.alabama.gov](http://www.rehab.alabama.gov)*



# Core System Contacts

Maria Crowley

State Head Injury Coordinator

205-290-4590 or 888-879-4706

[maria.crowley@rehab.alabama.gov](mailto:maria.crowley@rehab.alabama.gov)

[www.rehab.alabama.gov/tbi](http://www.rehab.alabama.gov/tbi)

Alabama Head Injury Foundation

205-823-3818 or 800-433-8002

[ahif1@bellsouth.net](mailto:ahif1@bellsouth.net)

[www.ahif.org](http://www.ahif.org)

# Questions?



Supported in part by ALH21MC06738 from the Department of Health and Human Services Health Resources and Services Administration, Maternal and Child Health Bureau. The contents are the sole responsibility of the authors and do not necessarily represent the official views of DHHS.

# References

- 1 Faul M, Xu L, Wald MM, Coronado VG. Traumatic brain injury in the United States: emergency department visits, hospitalizations, and deaths. Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2010; [www.cdc.gov/TraumaticBrainInjury](http://www.cdc.gov/TraumaticBrainInjury)
- 2 "Traumatic Brain Injury Provider Training Manual". TBI Project. Michigan Department of Community Health. 2005.
- 3 "Traumatic Brain Injury Model Systems National Database Update". Traumatic Brain Injury Model Systems National Data and Statistical Center. [www.tbinds.org](http://www.tbinds.org). 2011.
- 4 "BIAA Adopts New TBI Definition." [www.biausa.org](http://www.biausa.org). Feb 6 2011.
- 5 "Traumatic brain injury." Mayo Clinic Staff. [www.MayoClinic.com](http://www.MayoClinic.com). Mayo Foundation for Medical Education and Research. Sep 16, 2010.
- 6 "Injury Prevention & Control: Traumatic Brain Injury." Centers for Disease Control and Prevention. [www.cdc.gov](http://www.cdc.gov). Sep 21, 2011.
- 7 National Institute on Disability and Rehabilitation Research; [www2.ed.gov](http://www2.ed.gov).
- 8 Defense and Veterans Brain Injury Center. [dvbic.org](http://dvbic.org)
- 9 "Traumatic Brain Injury: The Journey Home". [TraumaticBrainInjuryAtoZ.org](http://TraumaticBrainInjuryAtoZ.org)
- 10 [AfterDeployment.org](http://AfterDeployment.org)