



VISN 6 Mid-Atlantic MIRECC
Post Deployment Mental Health



Windows To The Brain:

Neuropsychiatry of Brain Injury and Co-morbidities

Robin A. Hurley, MD, FANPA
Salisbury VAMC ACOS of Research & Education
Professor, WFSM & BCM

Katherine H. Taber, PhD, FANPA
Salisbury VAMC Research Health Scientist
Professor, VCOM

Disclaimer: The views expressed in this session are strictly those of the presenters (RAH & KHT). They do NOT represent those of the Veteran's Health Administration, the Department of Defense, or the United States Government.

NOTE: These slides can NOT be reproduced or used without the express consent of the authors. No unauthorized audio or video recording of this lecture is permitted.

Neuropsychiatry of TBI: current understanding and future challenges

- Functional anatomy of emotion, memory, and behavior circuits
- Clinical deficits in OIF/OEF/OND brain injury and PTSD
- Current assessment & treatment advice for TBI with and without PTSD
- Brief mention of selected VISN 6 MIRECC post-deployment projects

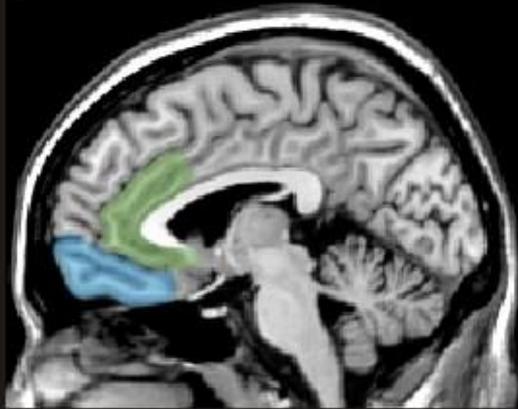
Poll Question # 1:

Your TBI interest is:

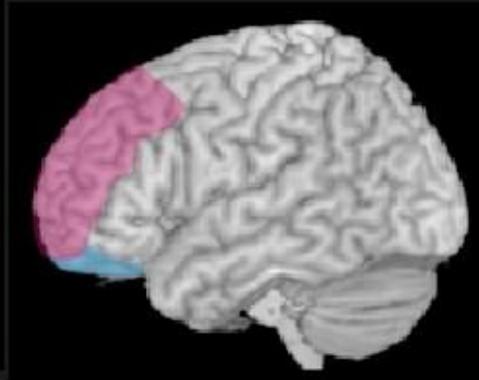


- A. Basic Science Research
- B. Clinical Science Research
- C. Clinical Care of Veterans returning from OIF/OEF/OND
- D. Educating Trainees

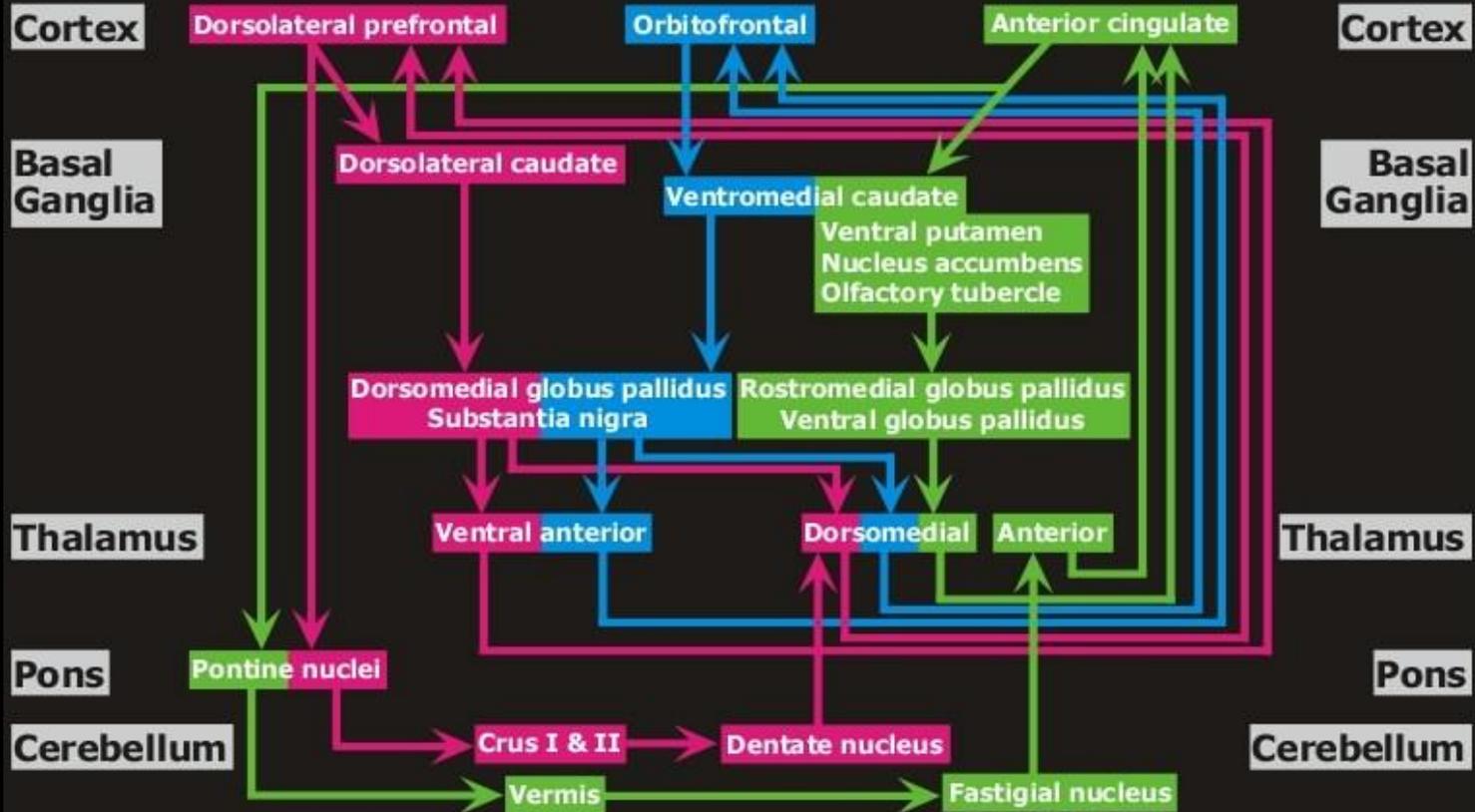
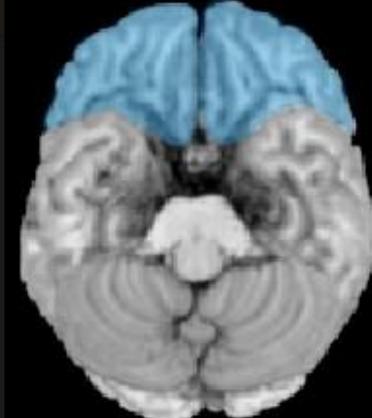
Midline Medial (Parasagittal)



Lateral

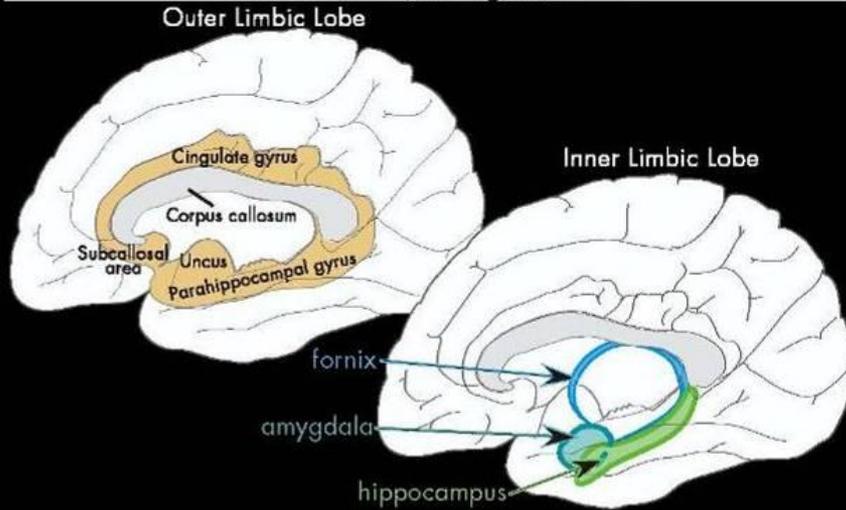


Inferior (Bottom)

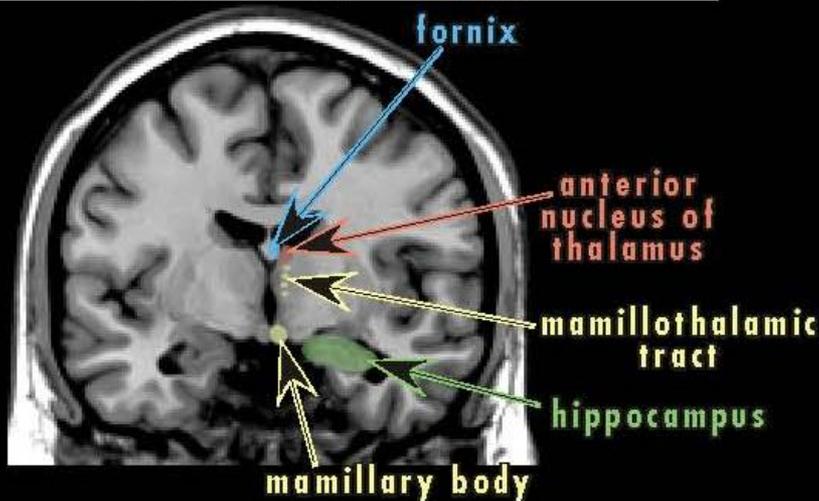


Emotion and Memory

Midline Medial (Parasagittal) Views



Coronal Brain Section



Anterior Cingulate cortex

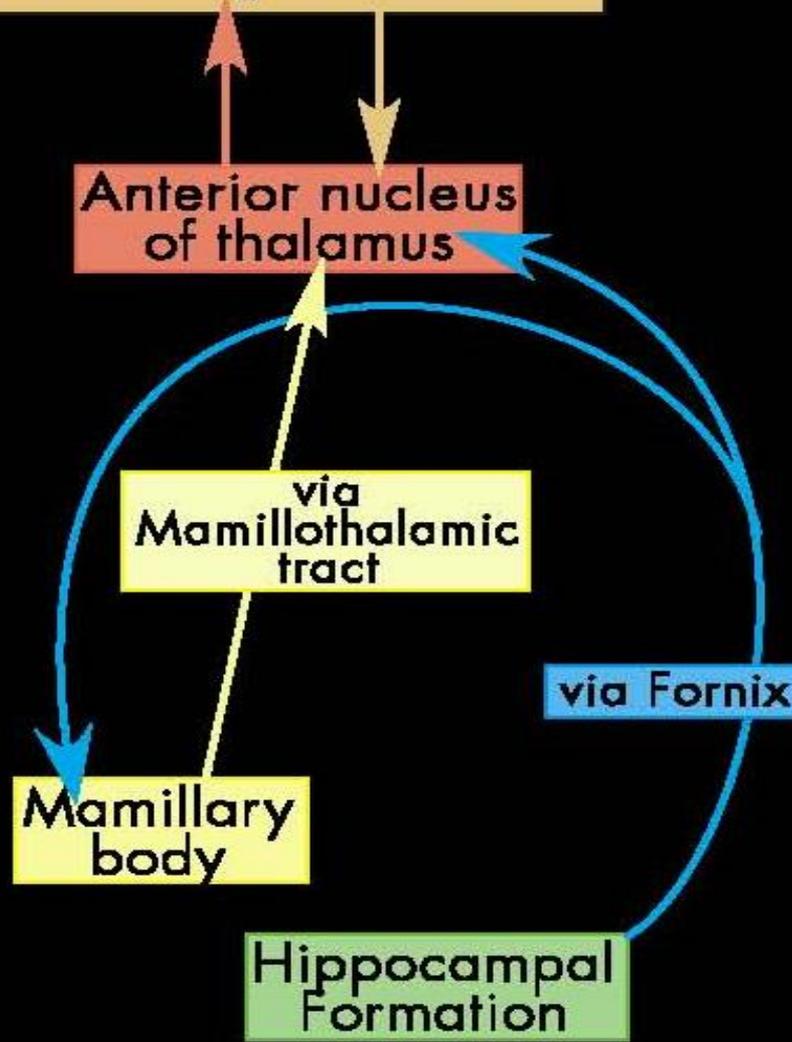
Anterior nucleus of thalamus

via
Mamillothalamic
tract

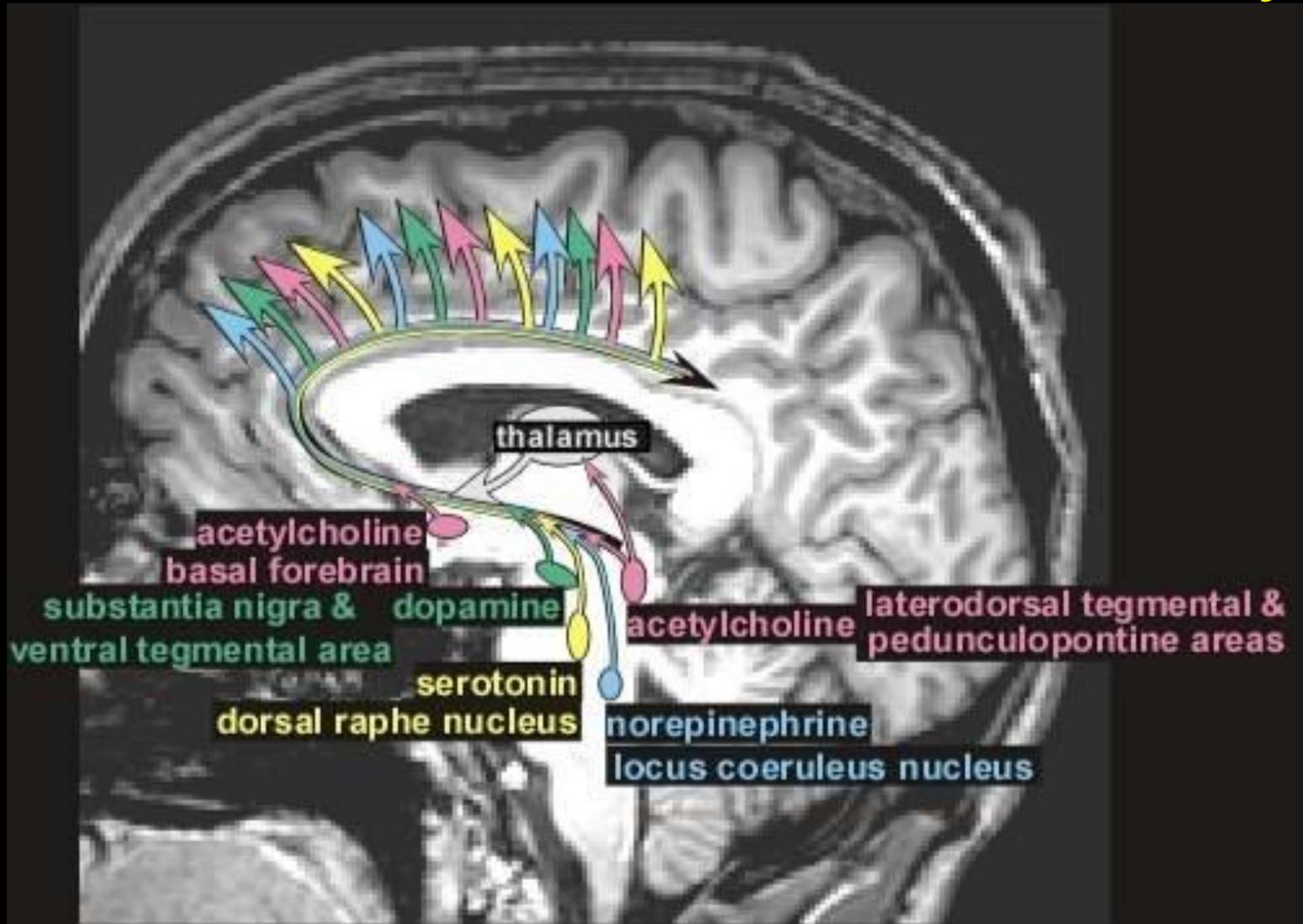
Mamillary
body

Hippocampal
Formation

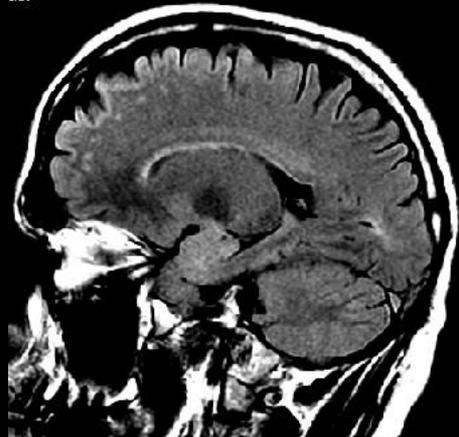
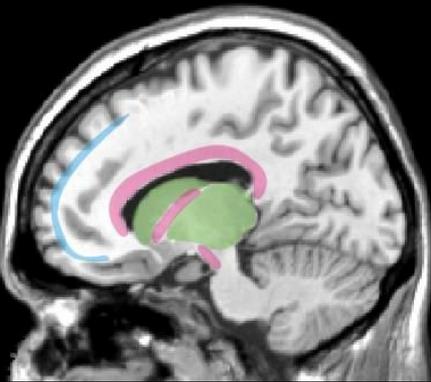
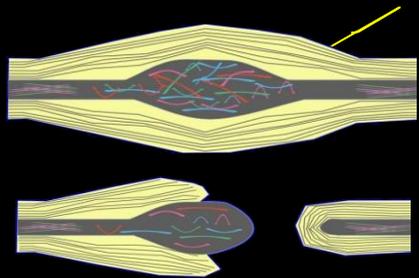
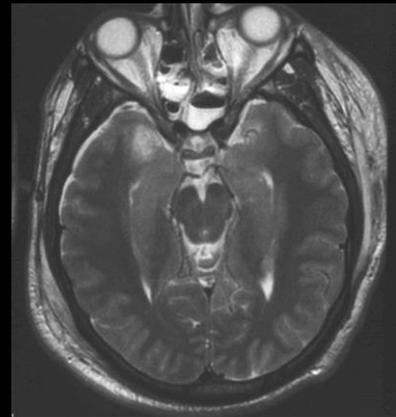
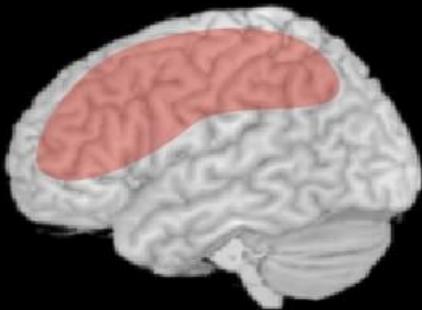
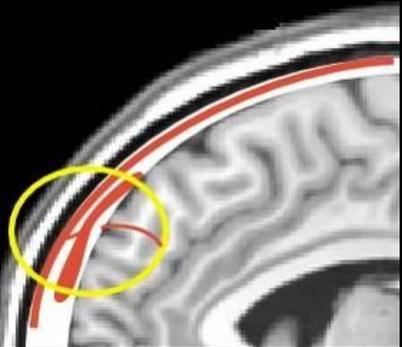
via Fornix



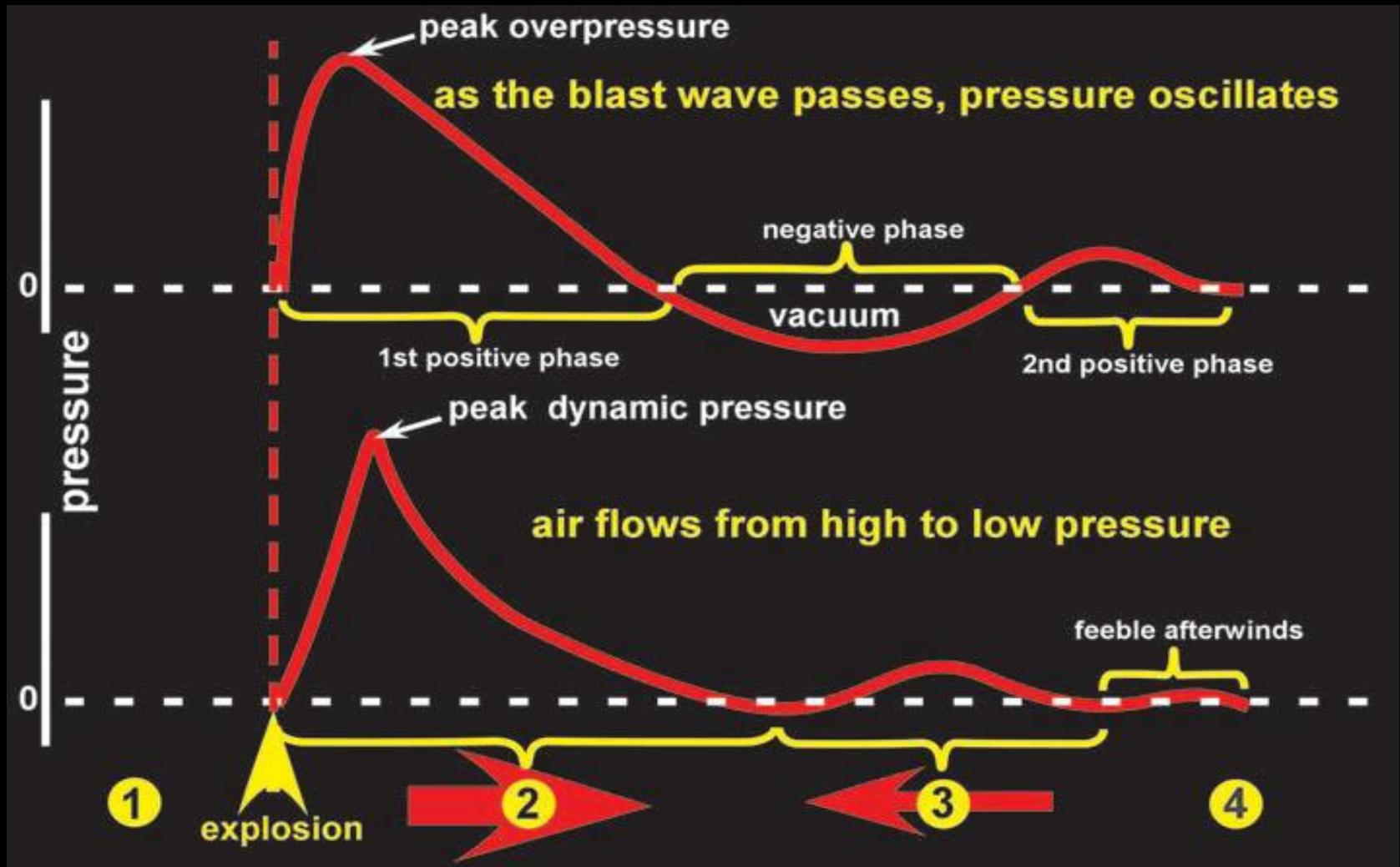
Anatomy of Neurotransmitters: Emotion, Behavior, and Memory



Where are the injuries? Subdurals, contusions, and DAI



Blast Injuries: What is known?



Injury Types

1

Blast Wind

2

Nails, shrapnel, etc

3

Roll-over, hitting
steering wheel, etc

4

Poisonous gasses,
burns, etc

Sensorineural Losses

- Accomodation, convergence, reading, oculomotor dysfunction (Brahm, 2009; Stelmack, 2009)
- Headaches (migraine, tension, mixed; 60-93%), (Ruff, 2008)
- Sensorineural hearing loss (62% with inpatient), tinnitus (38% with same sample), ruptured tympanic membrane – 35% (Lew 2007; Xydakis, 2007)
- Vertigo, gaze instability, motion intolerance, dizziness (59.3%; balance problems 25.9%) (Scherer, 2009; Terrio, 2009))

MH-TBI Co-morbidities:

- Personality change
- Cognitive impairment
- **Depression/Mania**
- **Generalized anxiety/panic**
- **Post traumatic stress**
- Substance abuse
- Psychosis
- Aggression
- Sleep impairments
- Affective lability

For more information:

<http://www.publichealth.va.gov/epidemiology/reports/oefoifond/health-care-utilization/index.asp>



Poll Question # 2: Frequency of Mild Concussions in Society

- Do you know someone close to you who has had a mild concussion and did not have a formal medical evaluation at the time of injury?
 - A. Yes
 - B. No



DoD Numbers for Traumatic Brain Injury Worldwide – Totals

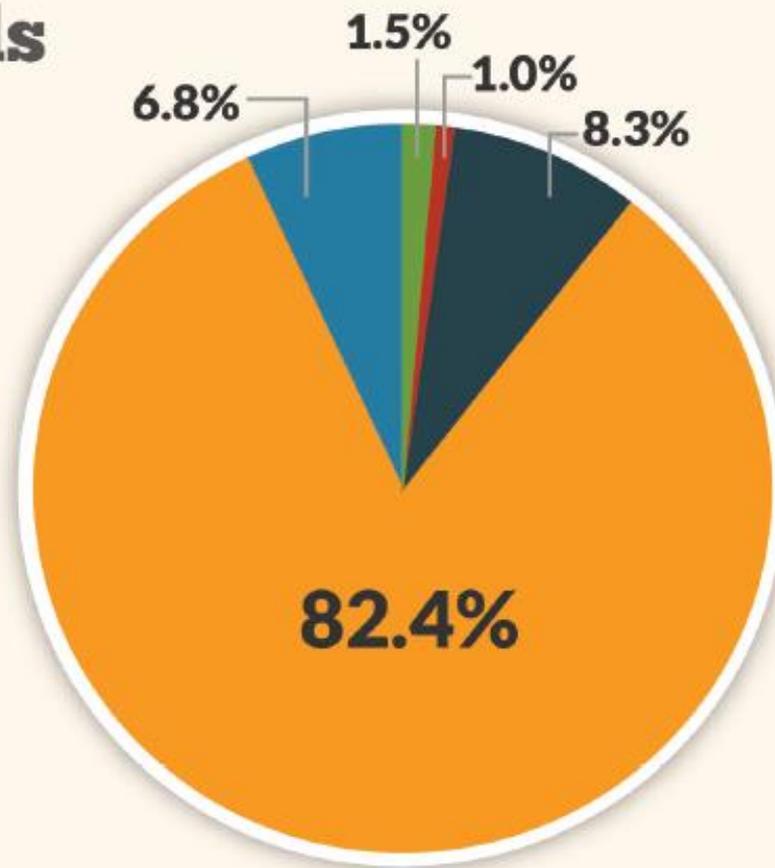
2000-2014 Q2

Penetrating	4,538
Severe	3,088
Moderate	25,370
Mild	253,350
Not Classifiable	20,937

Total - All Severities **307,283**

Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Center (AFHSC)

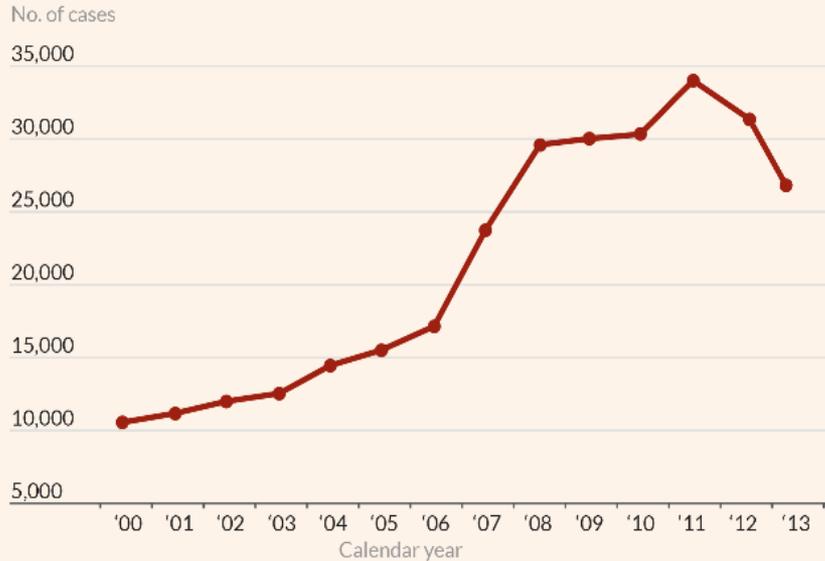
Prepared by the Defense and Veterans Brain Injury Center (DVBIC)



2000-2014 Q2, as of Aug 19, 2014



DoD Numbers for Traumatic Brain Injury Total Worldwide TBI Diagnoses



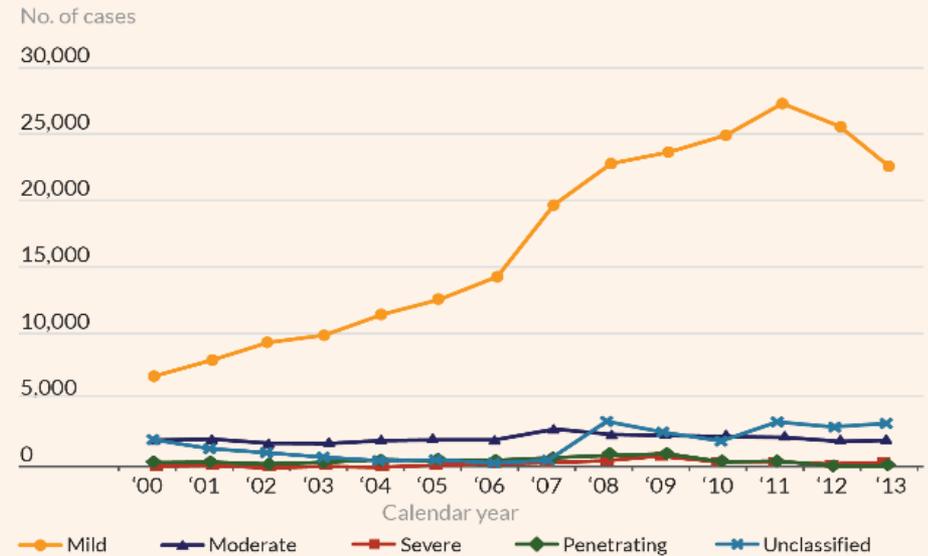
Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Center (AFHSC)

Prepared by MHS Office of Strategic Communications

2000-2013



DoD Numbers for Traumatic Brain Injury Worldwide - Incidence by Severity



Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Center (AFHSC)

Prepared by the Defense and Veterans Brain Injury Center (DVBIC)

2000-2013

<http://dvbic.dcoe.mil/dod-worldwide-numbers-tbi>

TBI Exposures entering VA Healthcare System

15%-20% entering VHA have + TBI screen (Carlson et al, 2010; Pietrzak et al, 2009)

April 2007 - FY2009, 66,023 Veterans identified as possibly having a TBI through outpatient screening of individuals presenting to VA from OIF/OEF. Of those screened positive, 24,559 were confirmed to have sustained a TBI (37%). (Veteran's Health Initiative: Traumatic Brain Injury, released April 2010.

<http://www.publichealth.va.gov/docs/vhi/traumatic-brain-injury-vhi.pdf>

VA Health Care Utilization – OEF/OIF Veterans FY 2002 through May, 2014

- *Among all 1,819,913 separated eligible OEF/OIF Veterans*
 - **60% (1,089,668)** of total separated OEF/OIF veterans have obtained **VA** health care since FY 2002 (cum. total)
 - **92% (1,006,551)** evaluated OEF/OIF patients have been seen as **outpatients** only by VA and not hospitalized
 - **8% (83,117)** evaluated OEF/OIF patients have been **hospitalized** at least once in a VA health care facility

Cumulative thru May, 2014.

<http://www.publichealth.va.gov/epidemiology/reports/oefoifond/health-care-utilization/index.asp>

Common Diagnoses in OEF / OIF Veterans

Diagnosis (Broad ICD-9 Categories)	Frequency *	%
Diseases of Musculoskeletal System/Connective System (710-739)	659,649	60.5
Mental Disorders (290-319)	615,922	56.5
Symptoms, Signs, Ill-defined Conditions (780-799)	615,064	56.4
Diseases of Nervous System/ Sense Organs (320-389)	537,074	49.3
Injury/Poisonings (800-999)	345,775	31.7

Disease Category (ICD 290-319 code)	Total Number of OIF/OEF Veterans*
PTSD (ICD-9CM 309.81)+	337,285
Depressive Disorders (311)	270,005
Neurotic Disorders (300)	254,972

*Cumulative through May, 2014. <http://www.publichealth.va.gov/epidemiology/reports/oefoifond/health-care-utilization/index.asp>

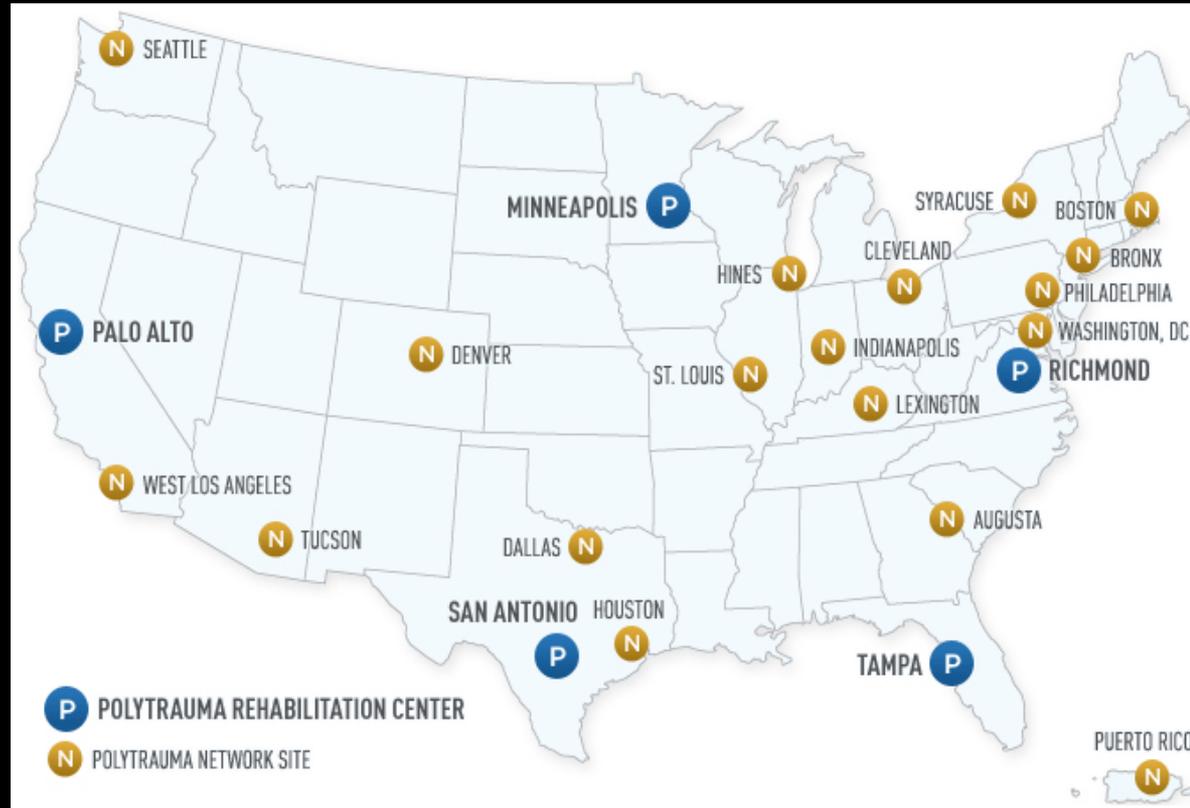
WWW.polytrauma.va.gov

Level 1 Inpatient centers:

Richmond
Tampa
Minneapolis
San Antonio
Palo Alto

Level 2 Intensive Outpatient Centers:

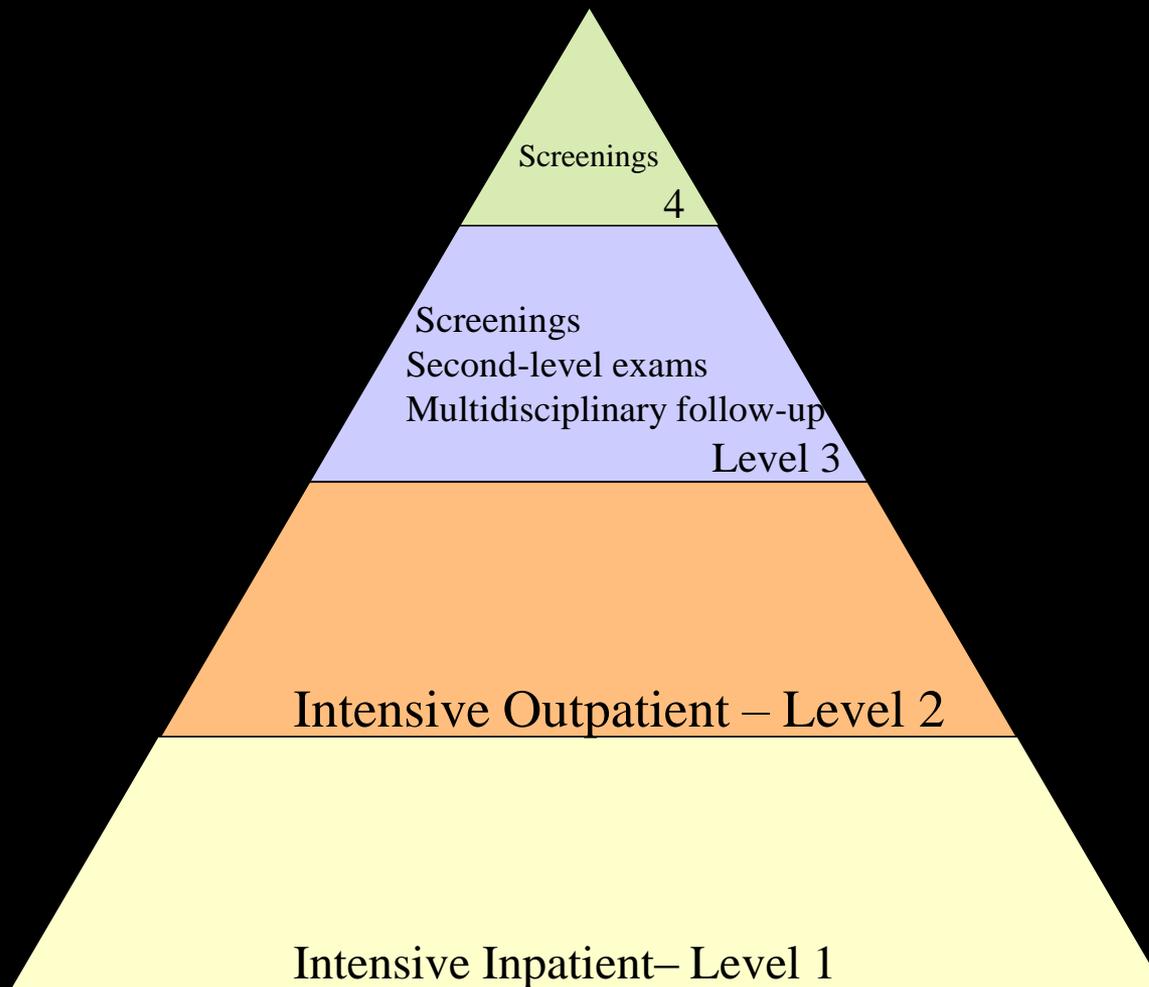
Boston, MA	San Juan, PR
Syracuse, NY	Lexington, KY
Bronx, NY	Cleveland, OH
Philadelphia, PA	Indianapolis, IN
Washington, DC	Hines, IL
Augusta, GA	St. Louis, MO
Houston, TX	Denver, CO
Dallas, TX	Seattle, WA
Tucson, AZ	West Los Angeles, CA



Level 3 Outpatient Centers:

Polytrauma Centers

www.polytrauma.va.gov



Neuropsychiatry of TBI: current understanding and future challenges

- Functional anatomy of emotion, memory, and behavior circuits
- Clinical deficits in OIF/OEF/OND brain injury and PTSD
- Current assessment & treatment advice for TBI with and without PTSD
- Brief mention of selected VISN 6 MIRECC post-deployment projects

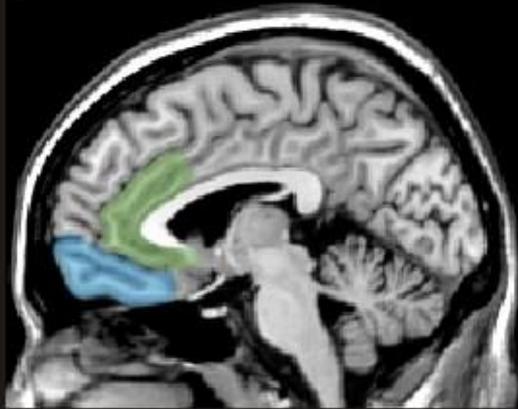
Poll Question # 1:

Your TBI interest is:

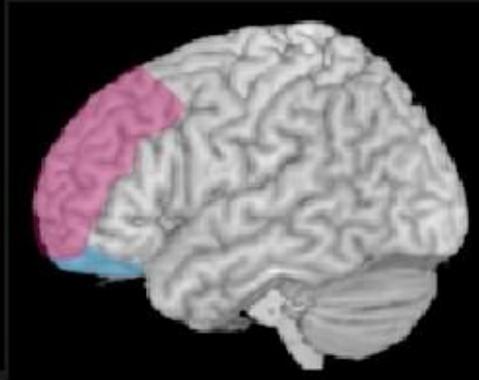


- A. Basic Science Research
- B. Clinical Science Research
- C. Clinical Care of Veterans returning from OIF/OEF/OND
- D. Educating Trainees

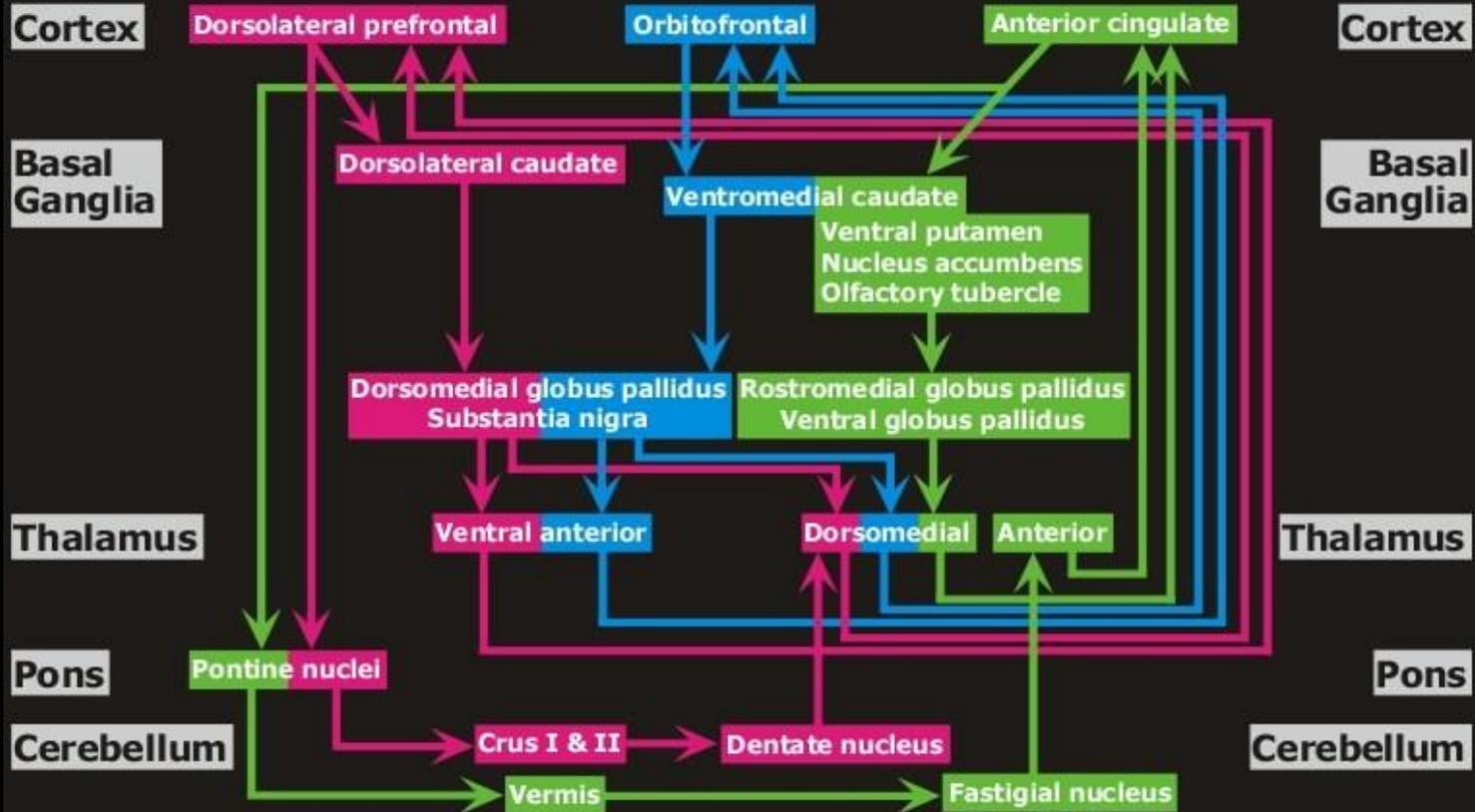
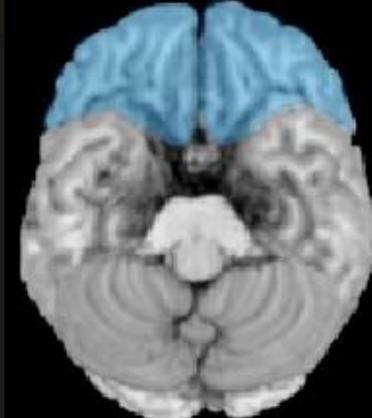
Midline Medial (Parasagittal)



Lateral

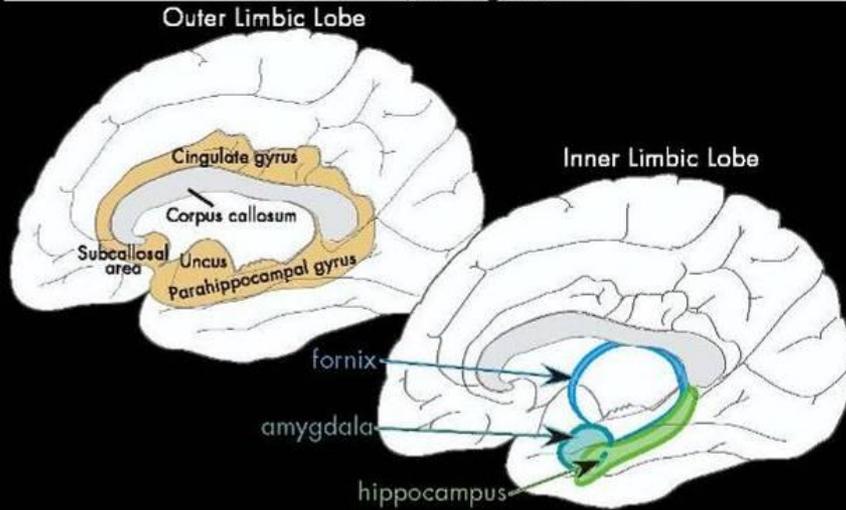


Inferior (Bottom)

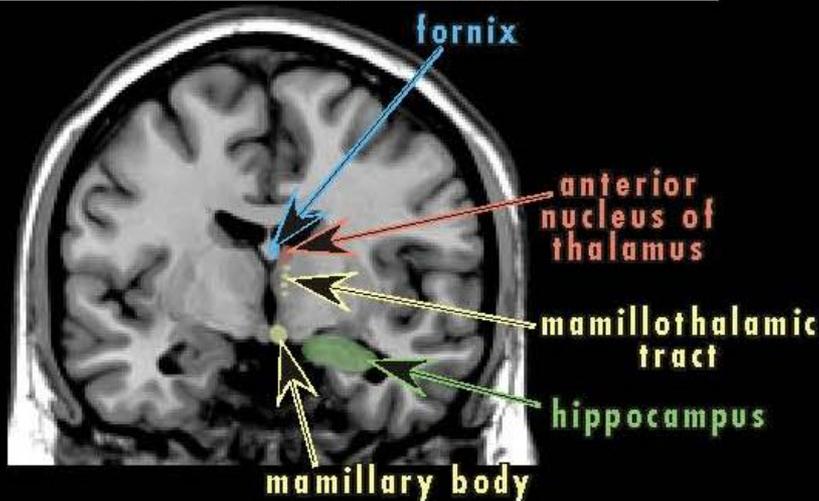


Emotion and Memory

Midline Medial (Parasagittal) Views



Coronal Brain Section



Anterior Cingulate cortex

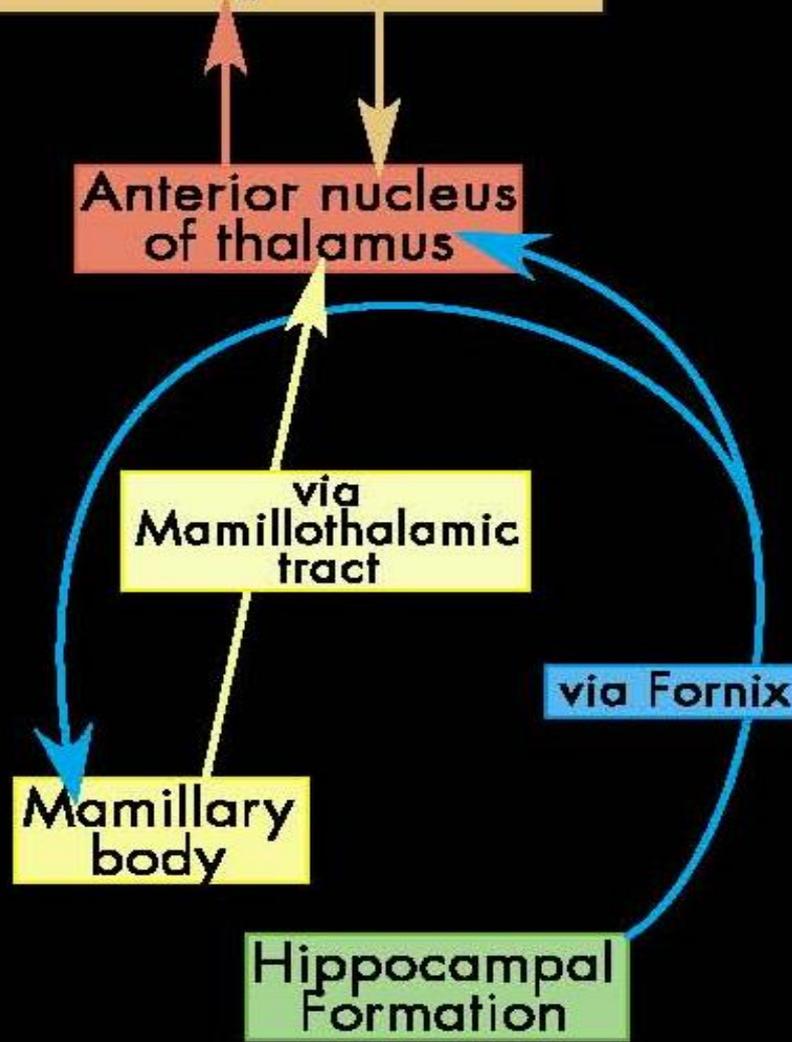
Anterior nucleus of thalamus

via
Mamillothalamic
tract

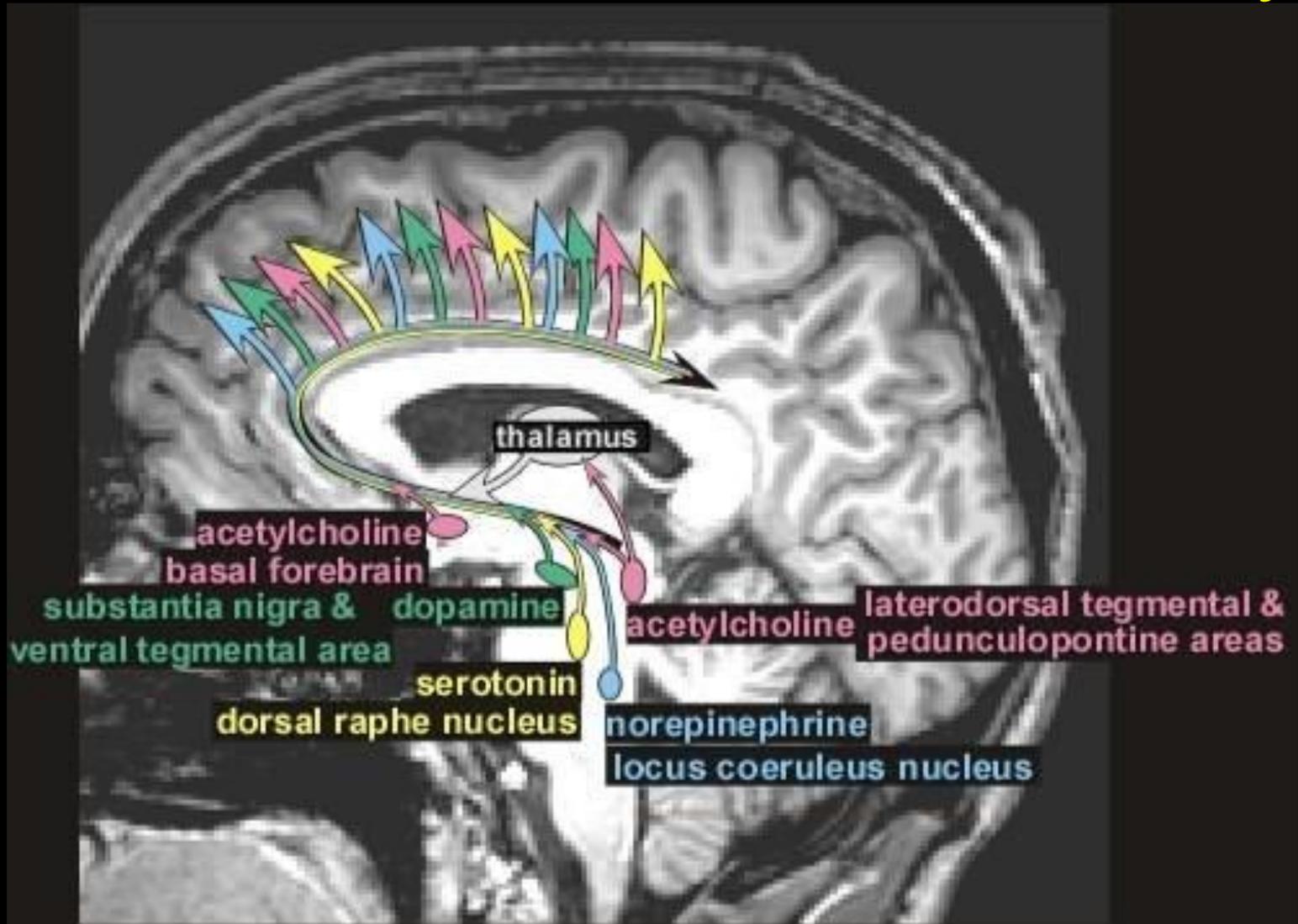
Mamillary
body

Hippocampal
Formation

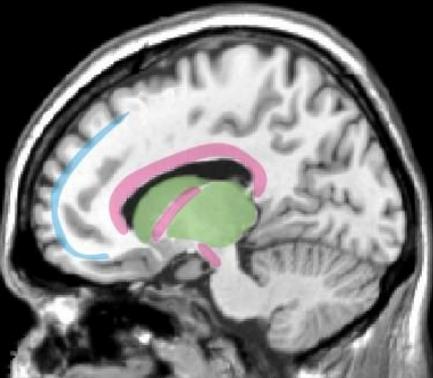
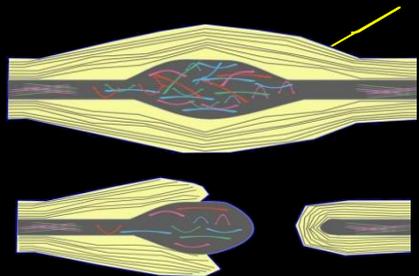
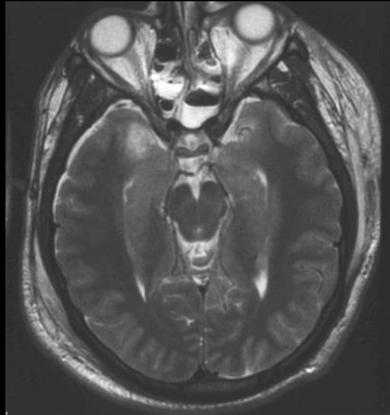
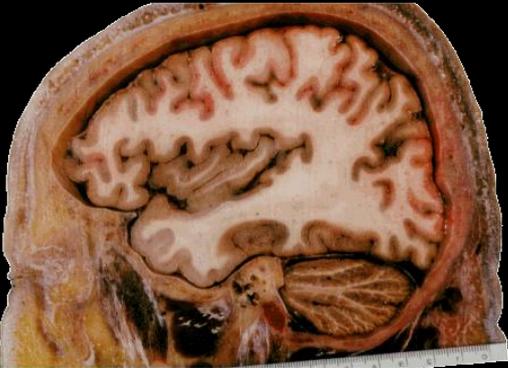
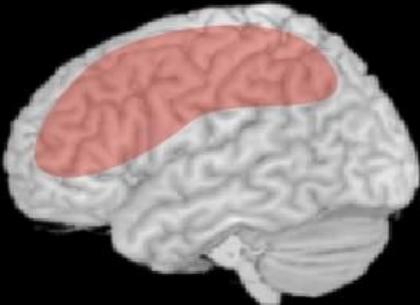
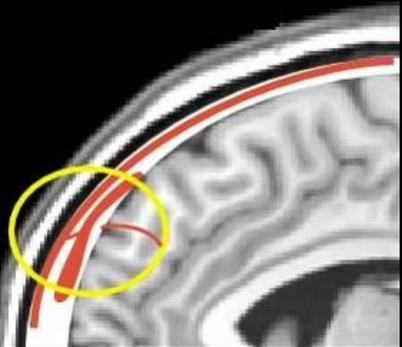
via Fornix



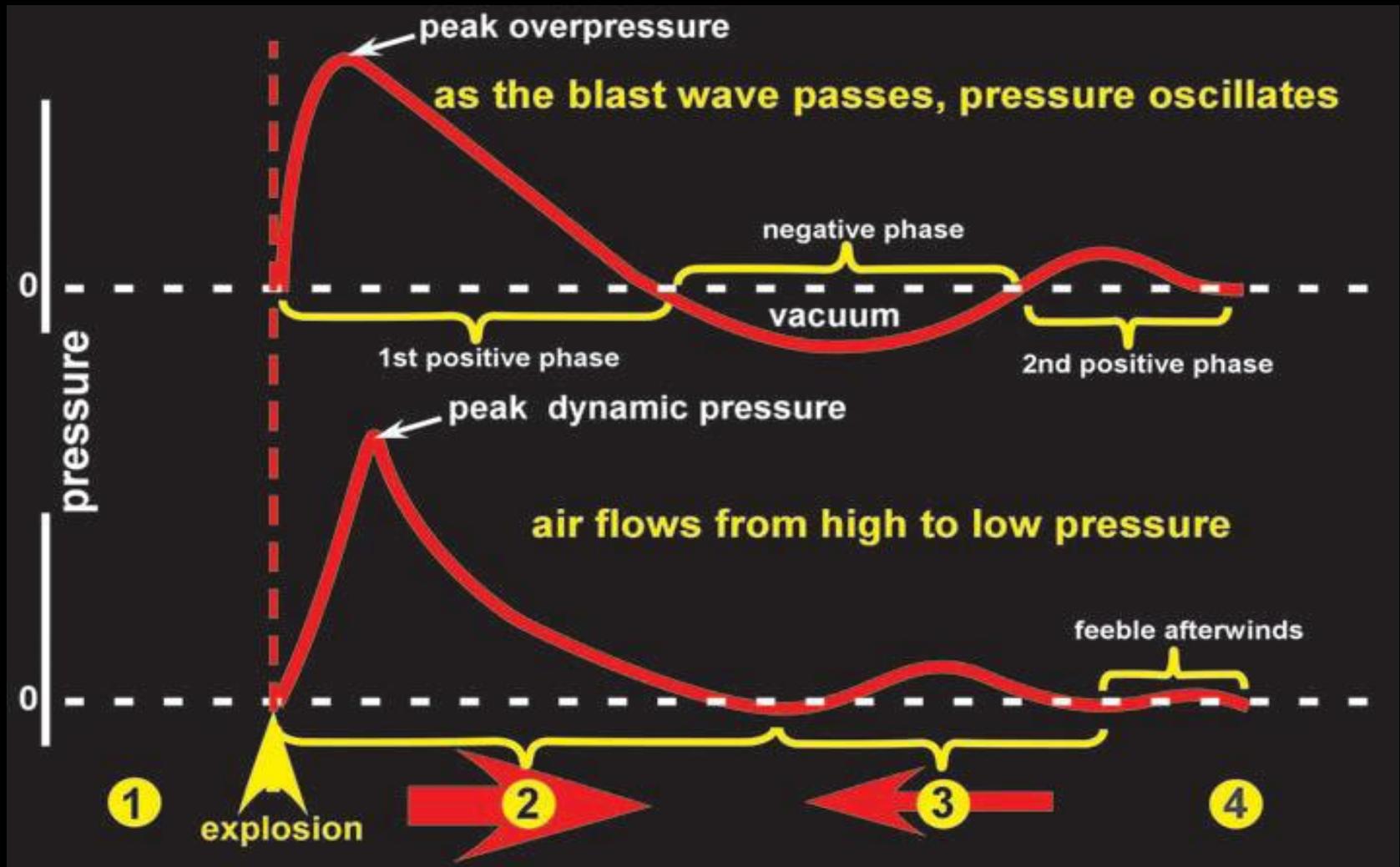
Anatomy of Neurotransmitters: Emotion, Behavior, and Memory



Where are the injuries? Subdurals, contusions, and DAI



Blast Injuries: What is known?



Injury Types

1

Blast Wind

2

Nails, shrapnel, etc

3

Roll-over, hitting
steering wheel, etc

4

Poisonous gasses,
burns, etc

Sensorineural Losses

- Accomodation, convergence, reading, oculomotor dysfunction (Brahm, 2009; Stelmack, 2009)
- Headaches (migraine, tension, mixed; 60-93%), (Ruff, 2008)
- Sensorineural hearing loss (62% with inpatient), tinnitus (38% with same sample), ruptured tympanic membrane – 35% (Lew 2007; Xydakis, 2007)
- Vertigo, gaze instability, motion intolerance, dizziness (59.3%; balance problems 25.9%) (Scherer, 2009; Terrio, 2009))

MH-TBI Co-morbidities:

- Personality change
- Cognitive impairment
- **Depression/Mania**
- **Generalized anxiety/panic**
- **Post traumatic stress**
- Substance abuse
- Psychosis
- Aggression
- Sleep impairments
- Affective lability

For more information:

<http://www.publichealth.va.gov/epidemiology/reports/oefoifond/health-care-utilization/index.asp>



Poll Question # 2: Frequency of Mild Concussions in Society

- Do you know someone close to you who has had a mild concussion and did not have a formal medical evaluation at the time of injury?
 - A. Yes
 - B. No



DoD Numbers for Traumatic Brain Injury Worldwide – Totals

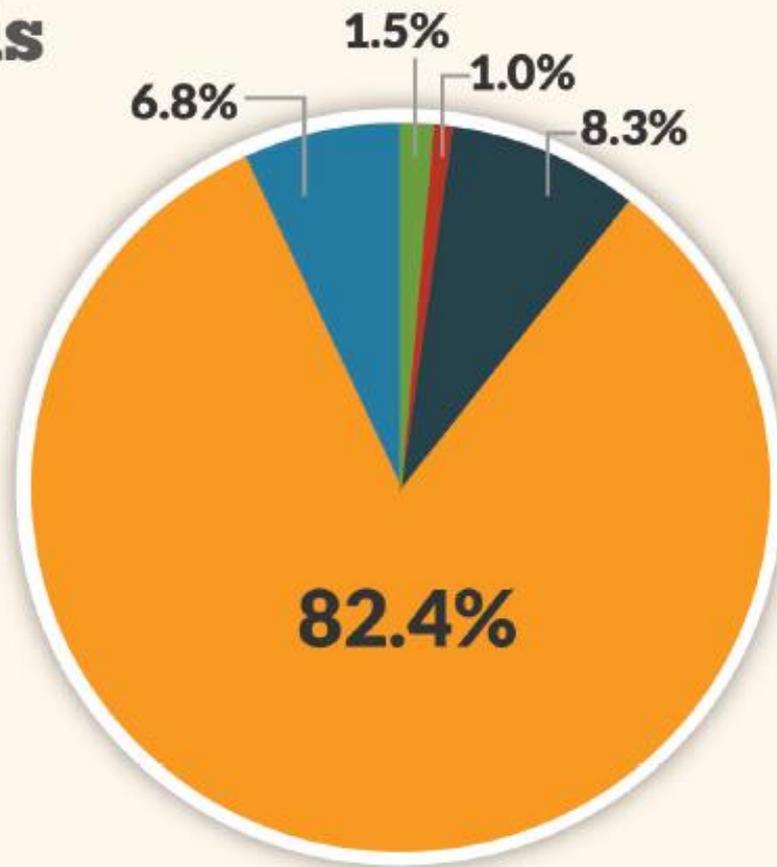
2000-2014 Q2

Penetrating	4,538
Severe	3,088
Moderate	25,370
Mild	253,350
Not Classifiable	20,937

Total - All Severities 307,283

Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Center (AFHSC)

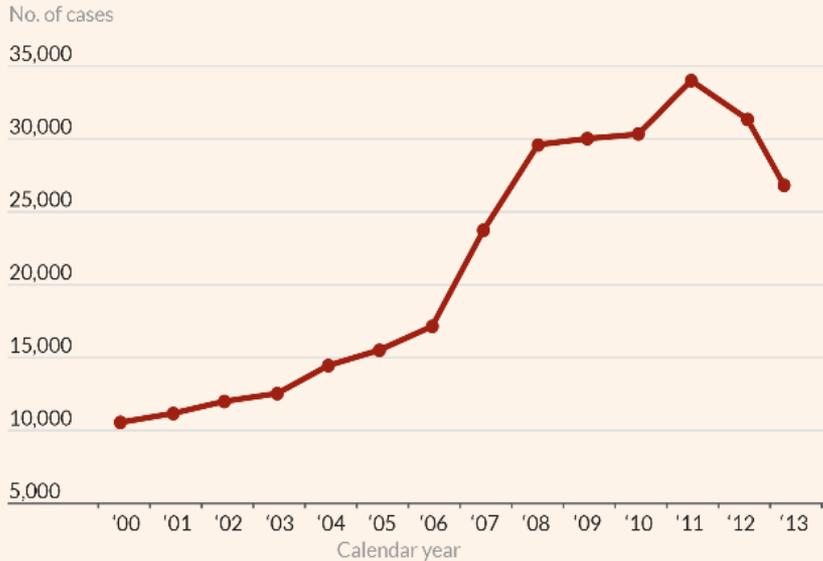
Prepared by the Defense and Veterans Brain Injury Center (DVBIC)



2000-2014 Q2, as of Aug 19, 2014



DoD Numbers for Traumatic Brain Injury Total Worldwide TBI Diagnoses



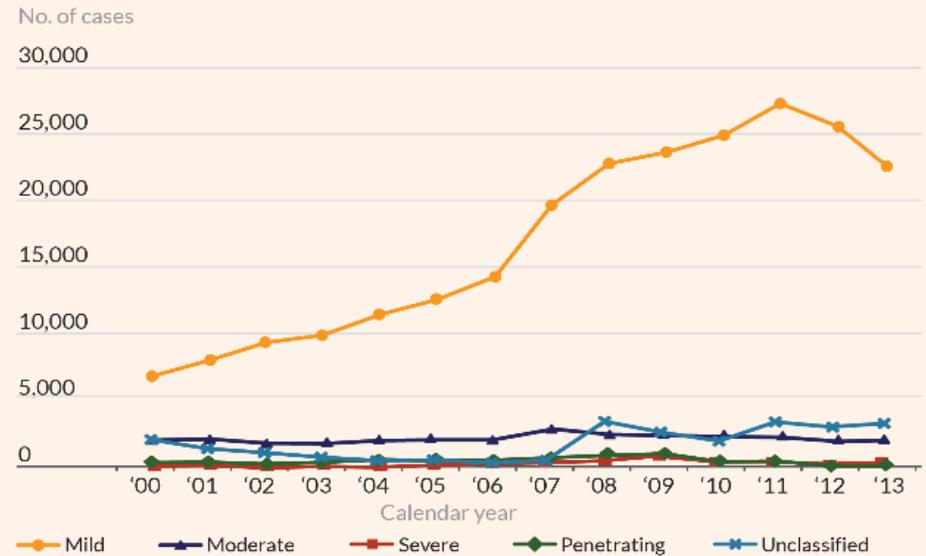
Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Center (AFHSC)

Prepared by MHS Office of Strategic Communications

2000-2013



DoD Numbers for Traumatic Brain Injury Worldwide - Incidence by Severity



Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed Forces Health Surveillance Center (AFHSC)

Prepared by the Defense and Veterans Brain Injury Center (DVBIC)

2000-2013

<http://dvbic.dcoe.mil/dod-worldwide-numbers-tbi>

TBI Exposures entering VA Healthcare System

15%-20% entering VHA have + TBI screen (Carlson et al, 2010; Pietrzak et al, 2009)

April 2007 - FY2009, 66,023 Veterans identified as possibly having a TBI through outpatient screening of individuals presenting to VA from OIF/OEF. Of those screened positive, 24,559 were confirmed to have sustained a TBI (37%). (Veteran's Health Initiative: Traumatic Brain Injury, released April 2010.

<http://www.publichealth.va.gov/docs/vhi/traumatic-brain-injury-vhi.pdf>

VA Health Care Utilization – OEF/OIF Veterans FY 2002 through May, 2014

- *Among all 1,819,913 separated eligible OEF/OIF Veterans*
 - **60% (1,089,668)** of total separated OEF/OIF veterans have obtained **VA** health care since FY 2002 (cum. total)
 - **92% (1,006,551)** evaluated OEF/OIF patients have been seen as **outpatients** only by VA and not hospitalized
 - **8% (83,117)** evaluated OEF/OIF patients have been **hospitalized** at least once in a VA health care facility

Cumulative thru May, 2014.

<http://www.publichealth.va.gov/epidemiology/reports/oefoifond/health-care-utilization/index.asp>

Common Diagnoses in OEF / OIF Veterans

Diagnosis (Broad ICD-9 Categories)	Frequency *	%
Diseases of Musculoskeletal System/Connective System (710-739)	659,649	60.5
Mental Disorders (290-319)	615,922	56.5
Symptoms, Signs, Ill-defined Conditions (780-799)	615,064	56.4
Diseases of Nervous System/ Sense Organs (320-389)	537,074	49.3
Injury/Poisonings (800-999)	345,775	31.7

Disease Category (ICD 290-319 code)	Total Number of OIF/OEF Veterans*
PTSD (ICD-9CM 309.81)+	337,285
Depressive Disorders (311)	270,005
Neurotic Disorders (300)	254,972

*Cumulative through May, 2014. <http://www.publichealth.va.gov/epidemiology/reports/oefoifond/health-care-utilization/index.asp>

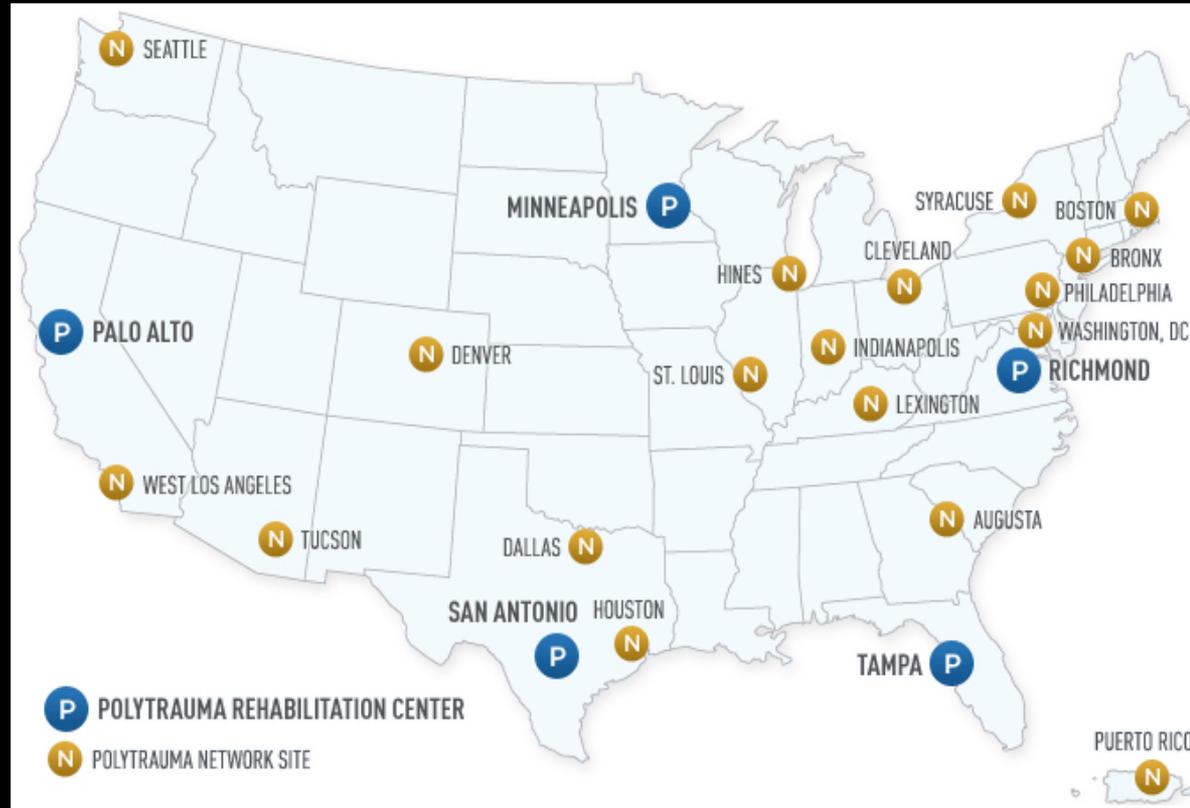
WWW.polytrauma.va.gov

Level 1 Inpatient centers:

Richmond
Tampa
Minneapolis
San Antonio
Palo Alto

Level 2 Intensive Outpatient Centers:

Boston, MA	San Juan, PR
Syracuse, NY	Lexington, KY
Bronx, NY	Cleveland, OH
Philadelphia, PA	Indianapolis, IN
Washington, DC	Hines, IL
Augusta, GA	St. Louis, MO
Houston, TX	Denver, CO
Dallas, TX	Seattle, WA
Tucson, AZ	West Los Angeles, CA

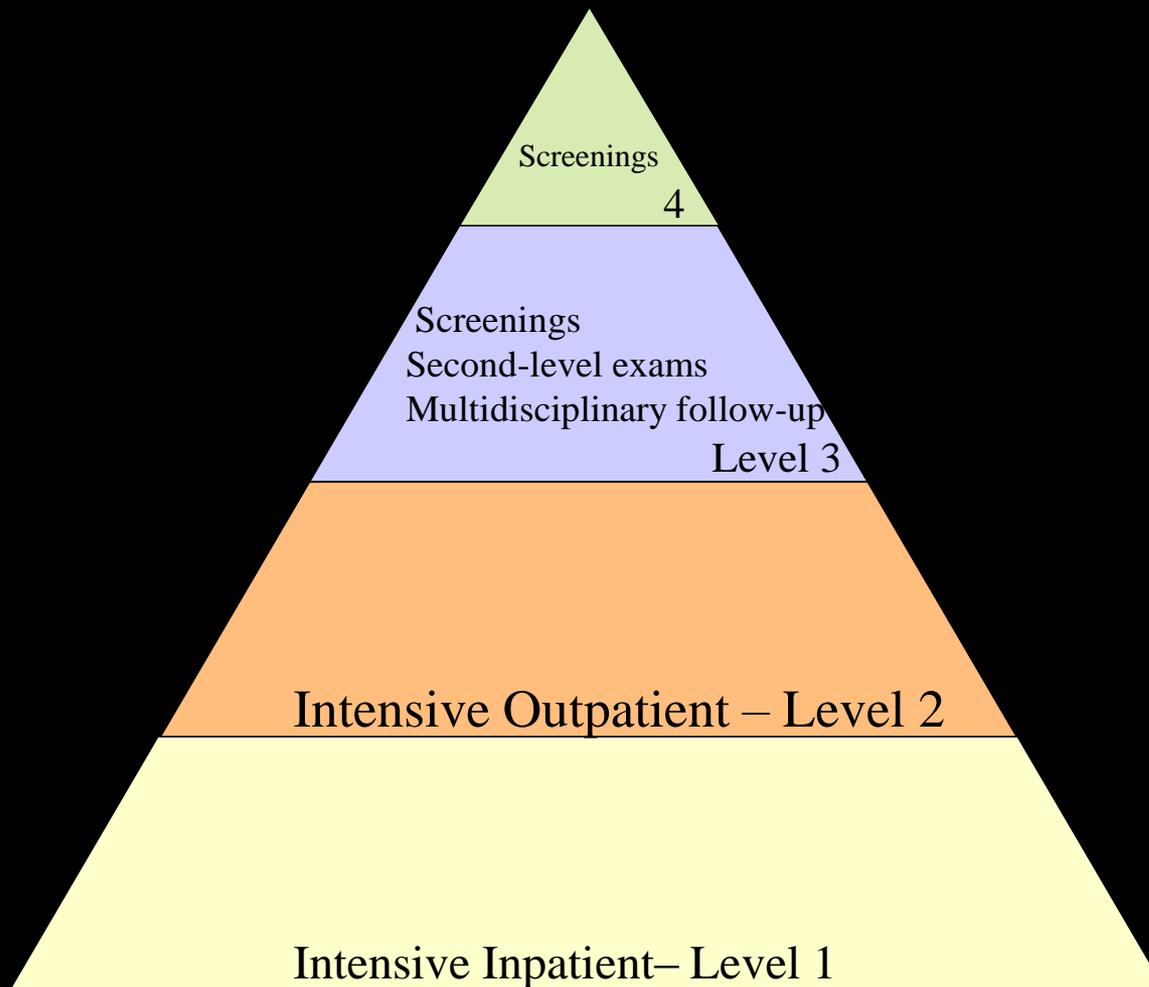


Level 3 Outpatient Centers:

Currently there are 87 Polytrauma Support Clinic Teams (PSCT) located in VA medical centers across the country.

Polytrauma Centers

www.polytrauma.va.gov



TBI Screening: TRAUMATIC BRAIN INJURY SCREENING

Has the veteran already been diagnosed as having TBI during OIF/OEF deployment? No

Section 1: The veteran experienced the following events during OIF/OEF deployment:

Blast or Explosion IED (improvised explosive device), RPG (rocket propelled grenade), Land Mine, Grenade, etc.
Vehicular accident/crash (any vehicle, including aircraft)
Fragment wound or bullet wound above the shoulders
Fall

Section 2: The veteran had the following symptoms immediately afterwards:

Losing consciousness/"knocked out"
Being dazed, confused or "seeing stars"
Not remembering the event
Concussion
Head injury

Section 3: The veteran states the following problems began or got worse afterwards:

Memory problems or lapses
Balance problems or Dizziness
Sensitivity to bright light
Irritability
Headaches
Sleep problems

Section 4: The veteran relates he/she is currently having or has had the following symptoms within the past week:

5d1 A Blast Primary (When a high explosive bomb or IED goes off there is a "blast wave" which is a wave of highly compressed gas that hits solid objects like a person's body and may feel almost like smashing into a wall.)

Did you remember experiencing this type of "blast wave" or were told that you experienced it?

Yes No

Number of blasts in which this occurred

Select

Distance from closest blast

Select

5d2 B. Blast Secondary (This "blast wave" is followed by a wind in which particles of sand, debris, shrapnel, and fragments are moving rapidly.)

Were you close enough to the blast to be "peppered" or hit by such debris, shrapnel, or other items?

Yes No

Number of blasts in which this occurred

Select

Distance from closest blast

Select

5d3 C. Blast Tertiary

Were you thrown to the ground or against some stationary object like a wall or vehicle by the explosion? (This is not asking if you "ducked to the ground" to protect yourself).

Yes No

Number of blasts in which this occurred

Select

Distance from closest blast

Select

5d4 D. Blast Quaternary

Did you experience any of the following injuries as a result of an explosive blast: burns, wounds, broken bones, amputations, breathing toxic fumes, or crush injuries from structures falling onto you?

Clinical Screening and in-depth 2nd level exams



Why am I being screened for Traumatic Brain Injury (TBI)?

VA wants to provide you the highest quality health care. We offer all veterans and active duty service members who served in the combat theaters of Iraq or Afghanistan screening for Traumatic Brain Injury (TBI).

You are at risk for TBI if you were involved in a:

- Blast or explosion (IED, RPG, Land Mines, Grenades, etc.)
- Vehicular accident/crash
- Fragment wound above the shoulder
- Fall

If you choose to be screened, you and your health care team will get important information about your health. The screening may bring up issues or concerns that you have not thought about before. If you have TBI, we can start treatment more quickly and help you better manage symptoms.

You have the right to refuse TBI screening. This will not affect your on-going care in the VA or access to other services.

What is the screening test?

A member of the health care team will ask you some questions about your current health and combat experiences. It takes about 5 minutes to answer the questions.

How often will I need to be screened?

The VA recommends screening for TBI after each deployment.

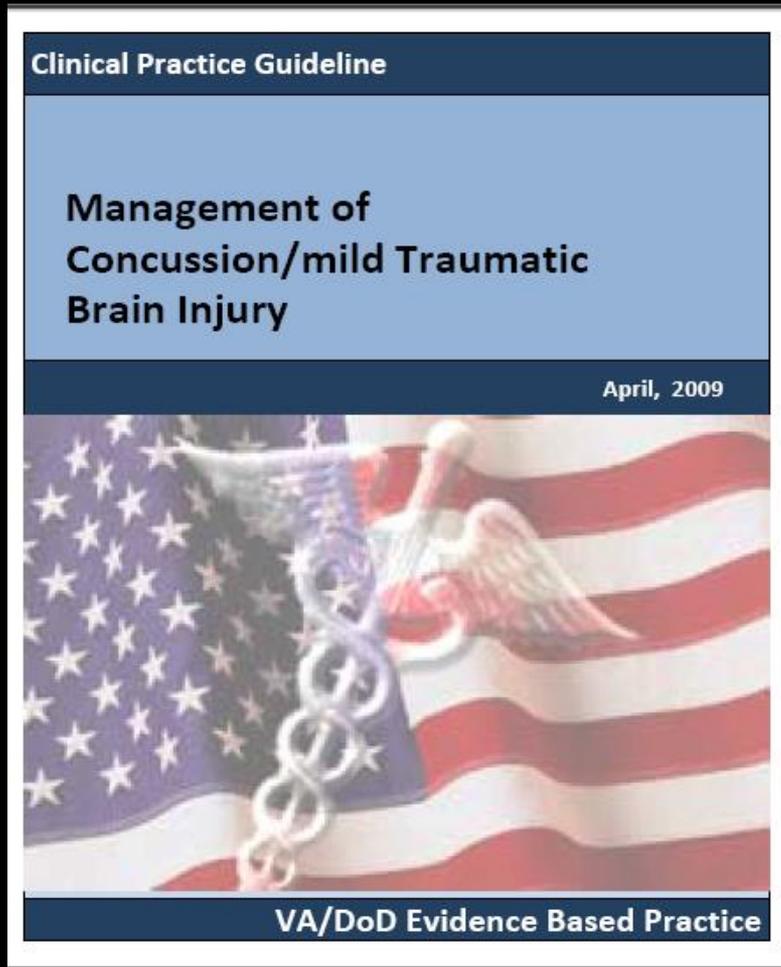
When will I get my results?

We will tell you right after the screening if your test results are positive or negative.

What does it mean if my screening is positive?

Positive screening does not necessarily mean you have TBI. It means that you are noticing some symptoms like those of people who have TBI. Your symptoms may also be due to other medical conditions.

Mild TBI: Clinical Practice Guidelines



- Focus on promoting recovery
 - Vast majority improve without lasting effects
 - Common injury with time-limited, predictable course
- Diagnosis is measure of exposure and tells you nothing about current symptoms
- Education of patients and families is best available recommended treatment
- The practice guideline takes the clinician through each symptom step-by-step for recommended assessment and treatments.



Clinical Recommendation:

Neuroimaging Following Mild Traumatic Brain Injury (Non-deployed Setting)

MRI in Acute Stage

Indications for MRI in Acute Stage include:

- Sustained a concussion with alteration of consciousness (AOC) to include any memory loss greater than 15 minutes and has persisting or worsening symptoms after 72 hours.
- Sustained concussion with loss of consciousness (LOC) greater than 30 minutes and has persisting or worsening symptoms after 72 hours despite a normal CT.
- Sustained three or more concussions in past 12 months.
- Has a documented diagnosis of concussion and has a Military Acute Concussion Evaluation (MACE) Cognitive Score of less than 25, after 72 hours post-injury.

Sub-acute Stage

Sub-acute: 8 to 89 days after injury

- Goal : Evaluate SM, enhance understanding of symptoms, provide education, and identify the need for specialist referral
- Key Points:
 - Treatment relies heavily on trajectory of symptoms
 - History of injury is critical to making right decision

Minimum requirements for MRI are outlined in the Preferred 1.5 T Protocol (Appendix A)

- MRI should be complete before referral to specialty care
- If MRI is unavailable or contraindicated, CT is the modality of choice

Chronic Stage

Chronic: 90 days after injury and beyond

- Goal: Further evaluate SM's injury, enhance understanding of persistent symptoms, provide counseling/education, identify need for specialty referral
- Key Points:
 - Repeat subsequent imaging if the previous exam was a CT
 - Repeat is also suggested if a previous MRI indicates need for follow-up, or if it did not meet the minimum recommendations sufficient for exam
 - If there are no structural abnormalities identified on the MRI or CT and/or abnormalities do not explain symptoms, PET or SPECT may offer additional information in the understanding of sequelae following mTBI.

Nuclear Medicine Modalities

Positron emission tomography (PET)

- Uses metabolic function to determine cerebral blood flow
 - 2-deoxy-2-(18F)fluoro-D-glucose
- Can detect decreased or increased metabolism in frontal and parietal lobes
 - Molecular imaging of inflammatory/ excitotoxic markers using a glutamate isotope.

Single Photon Emission Computed Tomography (SPECT)

- Uses short-lived radio active particles to determine blood flow
 - Technetium 99m-hexamethylpropylene amine oxime (99mTc-HMPAO)

Pharmacologic Treatment

- No large double-blinded placebo-controlled studies or FDA-approved meds for chronic symptoms due to TBI.
- Medications used are opinions of experts in field
- Patients more sensitive to side effects: watch closely for toxicity and drug-drug interactions.
- **“Rule-out” social factors first******
 - abuse, neglect, caregiver conflict, environmental issues
- No large quantities of lethal meds - suicide rate high!
- Full therapeutic trials: under treatment common
- Start low- Go slow!

Medications

- **SSRI's:** depression; +/- cognition
- **Anticonvulsants:** mood stabilization and seizure prevention
- **Atypical Antipsychotics:** aggression, agitation, irritability (beta blockers for severe cases)
- **Dopamine agonists:** cognition, concentration, focus
- **Cholinesterase Inhibitors:** memory
- **Atypical agents:**
 - **Buspirone** – emotional stabilization
 - **Modafinil** – concentration, focus
- Minimize benzodiazepines, anticholinergic, seizure-inducing or antidopaminergic agents (*impairs cognition; sedation; impedes neuronal recovery*)
- No caffeine (*agitation / insomnia*)
- No herbal, diet, “energy” products (*mania, hypertensive crisis, aggression*)
- No lithium – *delirium more likely*
- No MAOI inhibitors – diet noncompliance leads to *HTN crisis/stroke*
- No tricyclics – *lethal in overdose*
- NO bupropion for smoking– *seizure risk*

Rehabilitation Therapies

- Multidisciplinary rehabilitation program
<http://www.polytrauma.va.gov>
- Initial Education + cognitive/behavioral therapies
- Long term support
 - Group psychotherapy
 - Family therapy
 - Social issues: financial, legal, vocational, education, transportation
- National/local support groups and programs
 - Brain Injury Association: 1-800-444-6443
<http://www.biausa.org>

Guidance on Work/School

- Discuss with counselor and physician beforehand
- Meet with the Disability Office before planning class schedule
- Limit work hrs or class schedule at first
- On-line classes not recommended at first
- Follow suggested guidance on study habits/learning strategies
- Ask for help when needed

TBI & PTSD – post-combat Self Report



Schneiderman, Braver and Kang (2008) Am J Epidemiol 167:1446–1452

PTSD Clinician Diagnosis at VA sites:

13%-54% (Seal et al, 2007; Hawkins et al, 2010)

37.8% VA post-deployment clinic (Jakupcak, 2008)

In-common Symptoms:

Decreased concentration

Agitation/irritability

Insomnia

Social isolation and detachment

Impaired memory

Affect and Mood disturbances

Clinical Practice Guidelines: Post Traumatic Stress Disorder Substance Use Disorders

VA/DoD Clinical Practice Guideline

**Management of
Post-Traumatic Stress**

Version 2.0

GUIDELINE SUMMARY

2010



VA/DoD Evidence Based Practice

Clinical Practice Guideline

SUMMARY

**Management of
Substance Use Disorders (SUD)**

August, 2009



VA/DoD Evidence Based Practice

www.healthquality.va.gov

Cognitive Issues: adjust PTSD Rx for TBI

- Present information at slower pace
- For group: do not put “on the spot”; Allow to freely contribute or ask PTSD only to respond 1st; then ask dually dx to respond.
- Use structured intervention approach with agenda, outline, or handouts.
- Use refocus/redirection to topic or short sessions with breaks.
- Provide a clear transition between topics. Use agenda, outline, or handout.
- The therapist can frustrate the mTBI patient in trying to fully recall an event that was only partially encoded.

Practice Recommendations for the Treatment of Veterans with Co-morbid PTSD, mild TBI, and Pain:

http://www.mirecc.va.gov/docs/visn6/Report_Consensus_Conf_Practice_Recommend_TBI_PTSD_Pain.pdf

Poll Question # 3:

Future Directions: your opinion



- What do you think would be the best next step for continued public education on prevention of TBI?
 - A. Television public service announcements aimed at prevention
 - B. Social Media
 - C. Add to elementary/high school health class curriculum
 - D. PCs as educators (discuss with patients)



VISN 6 Mid-Atlantic MIRECC *Post Deployment Mental Health*



www.mirecc.va.gov/visn6



VISN 6 Mid-Atlantic MIRECC Post Deployment Mental Health



Quick Guide - Patient/ Family: Traumatic Brain Injury



Brain injuries are the "signature wounds" of our Global War on Terrorism. Returning combat veterans may not know they have suffered such a wound. That is why VA doctors want these "new warriors" and their families to have this information.

If the head is hit or shaken, a "concussion" or "closed head injury" can result. Concussion is seldom life threatening, so doctors often use the term "mild" when the person is only dazed or confused or loses consciousness for a short time. However, concussion can result in serious symptoms. People who survive multiple concussions may have more serious problems.

Common Symptoms of Brain Injury

- ★ "I just don't feel like myself"
- ★ Feeling light-headed or dizzy
- ★ Difficulty organizing daily tasks
- ★ Blurred vision or eyes tire easily
- ★ Headaches or ringing in the ears
- ★ Feeling sad, anxious or listless
- ★ Easily irritated or angered
- ★ Feeling tired all the time
- ★ Trouble with memory, attention, or concentration
- ★ More sensitive to sounds, lights or distractions
- ★ Impaired decision making or problem solving
- ★ Difficulty inhibiting behavior - impulsive
- ★ Slowed thinking, moving, speaking or reading
- ★ Easily confused, feeling easily overwhelmed
- ★ Change in sleep - much more or much less
- ★ Change in sexual interest or behavior

People who have had a concussion may say that they are "fine" although their behavior or personality has changed. If you notice such changes in a family member or friend, suggest they get medical help.

Recovery Following Brain Injury

Some symptoms may be present immediately. Others may appear much later. People experience brain injuries differently. Speed of recovery varies from person to person. Most people with mild injuries recover fully, but it can take time. In general, recovery is slower in older persons. People with a previous brain injury may find that it takes longer to recover from their current injury. Some symptoms can last for days, weeks, or longer.

Talk to your health care provider about any troubling symptoms or problems.

To Promote Healing & Manage Symptoms

Things That Can Help

- ★ Get plenty of rest & sleep
- ★ Increase activity slowly
- ★ Carry a notebook - write things down if you have trouble remembering
- ★ Establish a regular daily routine to structure activities
- ★ Do only one thing at a time if you are easily distracted - turn off the TV or radio while you work
- ★ Check with someone you trust when making decisions

Things That Can Hurt

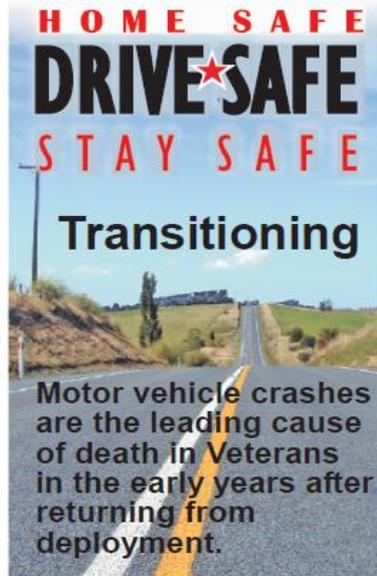
- ★ Avoid activities that could lead to another brain injury - examples include contact sports, motorcycles, skiing
- ★ Avoid alcohol as it may slow healing of the injury
- ★ Avoid caffeine or "energy-enhancing" products as they may increase symptoms
- ★ Avoid pseudoephedrine-containing products as they may increase symptoms - check the labels on cough, cold, and allergy medicines
- ★ Avoid excessive use of over-the-counter sleeping aids - they can slow thinking and memory

Resources for More Information & Help: Centers for Disease Control <http://www.cdc.gov/nicipo/tbi>
 Defense & Veterans Brain Injury Center <http://www.dvbic.org>
 Brain Injury Association <http://www.biausa.org>



Quick Guide - Patient/Family Readjustment

Military personnel are deeply affected by their war experiences. Adjustment difficulties are common. These are normal reactions to abnormal experiences. This series of brochures deal with issues that are common following deployment. Remember - identifying your problem areas and seeking help is a sign of strength, not weakness. It means you are actively coping with your challenges.



Motor vehicle crashes are the leading cause of death in Veterans in the early years after returning from deployment.



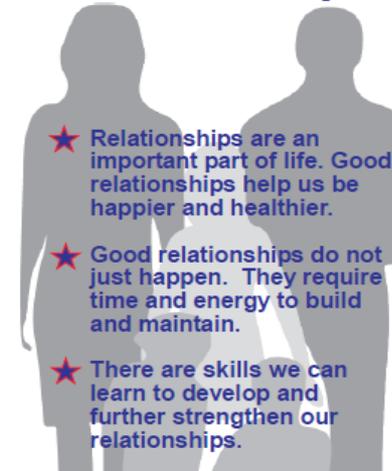
VA HEALTH CARE
Defining EXCELLENCE in the 21st Century



Quick Guide - Patient/Family Readjustment

Military personnel are deeply affected by their war experiences. Adjustment difficulties are common. These are normal reactions to abnormal experiences. This series of brochures deal with issues that are common following deployment. Remember - identifying your problem areas and seeking help is a sign of strength, not weakness. It means you are actively coping with your challenges.

Building Relationships



- ★ Relationships are an important part of life. Good relationships help us be happier and healthier.
- ★ Good relationships do not just happen. They require time and energy to build and maintain.
- ★ There are skills we can learn to develop and further strengthen our relationships.



Defining EXCELLENCE in the 21st Century

WWW.MIRECC.va.gov/VISN6/



VA Mid-Atlantic Health Care Network

VISN 6 Mid-Atlantic MIRECC Post Deployment Mental Health



VISN 6 > Education > Teaching Tools & Tips



VISN 6
*Post Deployment
Mental Health*

Another area of interest for us is development of new materials and approaches for presentation of complex information, such as functional

anatomy of the brain.

jump to: [Education Home](#) | [Readjustment Challenges](#) | [TBI](#) | [Newsletters](#)

Teaching Cases

Applying classroom-derived knowledge of functional anatomy to clinical practice is quite challenging for most learners. Educational research strongly supports the use of guided experiences - in which an expert explicitly draws the learner's attention to key connections - to promote the creation of active (useable) knowledge. This approach helps the learner establish connections between functional neuroanatomy and clinical practice, deepens their interest in the individual aspects of each patient, and enhances their appreciation of pathology and prognosis.

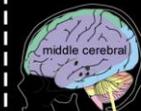
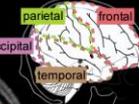
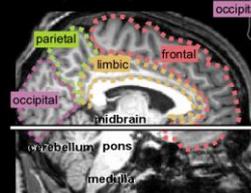
Case 1: Amnesic Disorder and Depression due to Cerebral Aneurysm and TBI

Case 2: Traumatic Brain Injury, Post-Traumatic Stress Disorder, and Headache

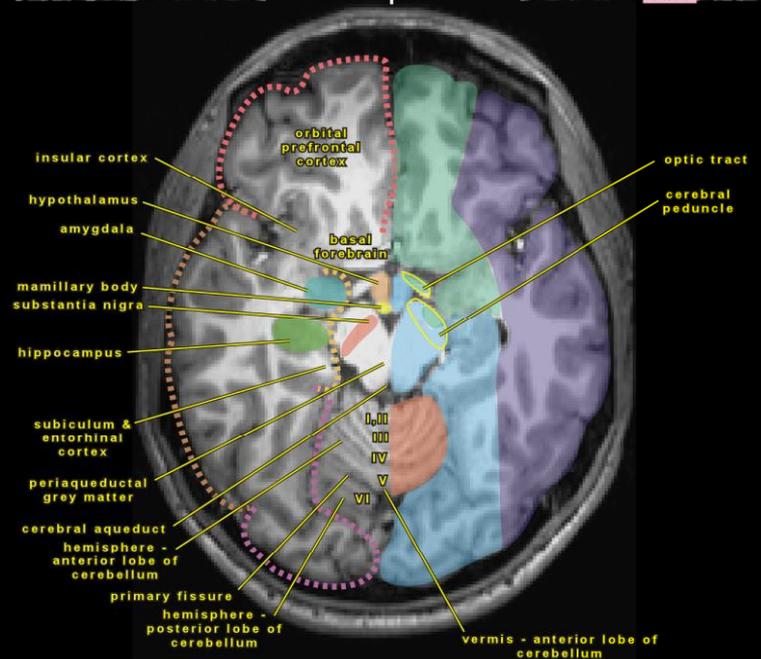
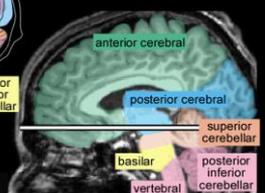
Case 3: Anger and Irritability 6 Years After Blast Injury

Case 4: Multiple Blast-Related Brain Injuries with Co-Morbidities

Cerebral Lobes & Major Regions



Arterial Territories & Major Tracts



WWW.MIRECC.va.gov/VISN6/

OK: so what don't we know....

- Is combat-related injury similar to or different from civilian TBI in long-term outcomes?
- In which cases will early deficits become permanent?
- Can objective testing be developed to identify any long-term deficits from mild combat-related TBI?
- Can we use the sports-related TBI literature as a guide?
- What are the best assessment strategies/tools for evaluation of patients with mild TBI, PTSD, and chronic pain?
- What are the best acute and longer term treatment protocols?
- What is the prognosis?

Current Resources Available

- Current Clinical Practice Guidelines at www.healthquality.va.gov
- TBI-PTSD Consensus Conference Summary:
www.ptsd.va.gov/professional/pages/traumatic-brain-injury-ptsd.asp
- New Evidence-Based Synthesis Report – Assessment and Treatment of Individuals with History of TBI and PTSD (August, 2009) at www.hsrd.research.va.gov/publications/esp/
- National Center for PTSD - www.ptsd.va.gov
- Information regarding outpatient cognitive rehabilitation programs (e.g. Phoenix, San Diego, and Salisbury) available upon request.
- MIRECC's and Centers of Excellence at WWW.MIRECC.va.gov
- Brain Injury Association – www.biausa.org

Together we can make a difference!
Thank you!

Robin A. Hurley, MD
robin.hurley@va.gov
www.mirecc.va.gov/visn6
704-638-9000 ext 4455

TBI Screening: TRAUMATIC BRAIN INJURY SCREENING

Has the veteran already been diagnosed as having TBI during OIF/OEF deployment? No

Section 1: The veteran experienced the following events during OIF/OEF deployment:

Blast or Explosion IED (improvised explosive device), RPG (rocket propelled grenade), Land Mine, Grenade, etc.
Vehicular accident/crash (any vehicle, including aircraft)
Fragment wound or bullet wound above the shoulders
Fall

Section 2: The veteran had the following symptoms immediately afterwards:

Losing consciousness/"knocked out"
Being dazed, confused or "seeing stars"
Not remembering the event
Concussion
Head injury

Section 3: The veteran states the following problems began or got worse afterwards:

Memory problems or lapses
Balance problems or Dizziness
Sensitivity to bright light
Irritability
Headaches
Sleep problems

Section 4: The veteran relates he/she is currently having or has had the following symptoms within the past week:

5d1 A Blast Primary (When a high explosive bomb or IED goes off there is a "blast wave" which is a wave of highly compressed gas that hits solid objects like a person's body and may feel almost like smashing into a wall.)

Did you remember experiencing this type of "blast wave" or were told that you experienced it?

Yes No

Number of blasts in which this occurred

Select

Distance from closest blast

Select

5d2 B. Blast Secondary (This "blast wave" is followed by a wind in which particles of sand, debris, shrapnel, and fragments are moving rapidly.)

Were you close enough to the blast to be "peppered" or hit by such debris, shrapnel, or other items?

Yes No

Number of blasts in which this occurred

Select

Distance from closest blast

Select

5d3 C. Blast Tertiary

Were you thrown to the ground or against some stationary object like a wall or vehicle by the explosion? (This is not asking if you "ducked to the ground" to protect yourself).

Yes No

Number of blasts in which this occurred

Select

Distance from closest blast

Select

5d4 D. Blast Quaternary

Did you experience any of the following injuries as a result of an explosive blast: burns, wounds, broken bones, amputations, breathing toxic fumes, or crush injuries from structures falling onto you?

Clinical Screening and in-depth 2nd level exams



Why am I being screened for Traumatic Brain Injury (TBI)?

VA wants to provide you the highest quality health care. We offer all veterans and active duty service members who served in the combat theaters of Iraq or Afghanistan screening for Traumatic Brain Injury (TBI).

You are at risk for TBI if you were involved in a:

- Blast or explosion (IED, RPG, Land Mines, Grenades, etc.)
- Vehicular accident/crash
- Fragment wound above the shoulder
- Fall

If you choose to be screened, you and your health care team will get important information about your health. The screening may bring up issues or concerns that you have not thought about before. If you have TBI, we can start treatment more quickly and help you better manage symptoms.

You have the right to refuse TBI screening. This will not affect your on-going care in the VA or access to other services.

What is the screening test?

A member of the health care team will ask you some questions about your current health and combat experiences. It takes about 5 minutes to answer the questions.

How often will I need to be screened?

The VA recommends screening for TBI after each deployment.

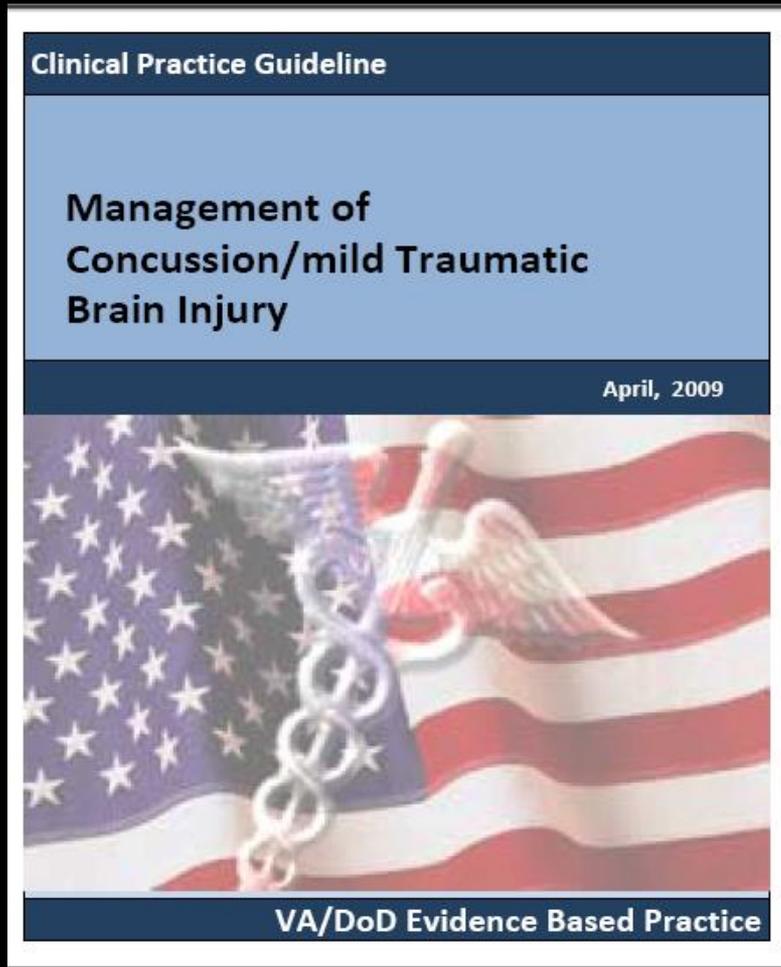
When will I get my results?

We will tell you right after the screening if your test results are positive or negative.

What does it mean if my screening is positive?

Positive screening does not necessarily mean you have TBI. It means that you are noticing some symptoms like those of people who have TBI. Your symptoms may also be due to other medical conditions.

Mild TBI: Clinical Practice Guidelines



- Focus on promoting recovery
 - Vast majority improve without lasting effects
 - Common injury with time-limited, predictable course
- Diagnosis is measure of exposure and tells you nothing about current symptoms
- Education of patients and families is best available recommended treatment
- The practice guideline takes the clinician through each symptom step-by-step for recommended assessment and treatments.



Clinical Recommendation:

Neuroimaging Following Mild Traumatic Brain Injury (Non-deployed Setting)

MRI in Acute Stage

Indications for MRI in Acute Stage include:

- Sustained a concussion with alteration of consciousness (AOC) to include any memory loss greater than 15 minutes and has persisting or worsening symptoms after 72 hours.
- Sustained concussion with loss of consciousness (LOC) greater than 30 minutes and has persisting or worsening symptoms after 72 hours despite a normal CT.
- Sustained three or more concussions in past 12 months.
- Has a documented diagnosis of concussion and has a Military Acute Concussion Evaluation (MACE) Cognitive Score of less than 25, after 72 hours post-injury.

Sub-acute Stage

Sub-acute: 8 to 89 days after injury

- Goal : Evaluate SM, enhance understanding of symptoms, provide education, and identify the need for specialist referral
- Key Points:
 - Treatment relies heavily on trajectory of symptoms
 - History of injury is critical to making right decision

Minimum requirements for MRI are outlined in the Preferred 1.5 T Protocol (Appendix A)

- MRI should be complete before referral to specialty care
- If MRI is unavailable or contraindicated, CT is the modality of choice

Chronic Stage

Chronic: 90 days after injury and beyond

- Goal: Further evaluate SM's injury, enhance understanding of persistent symptoms, provide counseling/education, identify need for specialty referral
- Key Points:
 - Repeat subsequent imaging if the previous exam was a CT
 - Repeat is also suggested if a previous MRI indicates need for follow-up, or if it did not meet the minimum recommendations sufficient for exam
 - If there are no structural abnormalities identified on the MRI or CT and/or abnormalities do not explain symptoms, PET or SPECT may offer additional information in the understanding of sequelae following mTBI.

Nuclear Medicine Modalities

Positron emission tomography (PET)

- Uses metabolic function to determine cerebral blood flow
 - 2-deoxy-2-(18F)fluoro-D-glucose
- Can detect decreased or increased metabolism in frontal and parietal lobes
 - Molecular imaging of inflammatory/ excitotoxic markers using a glutamate isotope.

Single Photon Emission Computed Tomography (SPECT)

- Uses short-lived radio active particles to determine blood flow
 - Technetium 99m-hexamethylpropylene amine oxime (99mTc-HMPAO)

Pharmacologic Treatment

- No large double-blinded placebo-controlled studies or FDA-approved meds for chronic symptoms due to TBI.
- Medications used are opinions of experts in field
- Patients more sensitive to side effects: watch closely for toxicity and drug-drug interactions.
- **“Rule-out” social factors first******
 - abuse, neglect, caregiver conflict, environmental issues
- No large quantities of lethal meds - suicide rate high!
- Full therapeutic trials: under treatment common
- Start low- Go slow!

Medications

- **SSRI's:** depression; +/- cognition
- **Anticonvulsants:** mood stabilization and seizure prevention
- **Atypical Antipsychotics:** aggression, agitation, irritability (beta blockers for severe cases)
- **Dopamine agonists:** cognition, concentration, focus
- **Cholinesterase Inhibitors:** memory
- **Atypical agents:**
 - **Buspirone** – emotional stabilization
 - **Modafinil** – concentration, focus
- Minimize benzodiazepines, anticholinergic, seizure-inducing or antidopaminergic agents (*impairs cognition; sedation; impedes neuronal recovery*)
- No caffeine (*agitation / insomnia*)
- No herbal, diet, “energy” products
mania, hypertensive crisis, aggression
- No lithium – *delirium more likely*
- No MAOI inhibitors – diet noncompliance leads to *HTN crisis/stroke*
- No tricyclics – *lethal in overdose*
- NO bupropion for smoking– *seizure risk*

Rehabilitation Therapies

- Multidisciplinary rehabilitation program
<http://www.polytrauma.va.gov>
- Initial Education + cognitive/behavioral therapies
- Long term support
 - Group psychotherapy
 - Family therapy
 - Social issues: financial, legal, vocational, education, transportation
- National/local support groups and programs
 - Brain Injury Association: 1-800-444-6443
<http://www.biausa.org>

Guidance on Work/School

- Discuss with counselor and physician beforehand
- Meet with the Disability Office before planning class schedule
- Limit work hrs or class schedule at first
- On-line classes not recommended at first
- Follow suggested guidance on study habits/learning strategies
- Ask for help when needed

TBI & PTSD – post-combat Self Report



Schneiderman, Braver and Kang (2008) Am J Epidemiol 167:1446–1452

PTSD Clinician Diagnosis at VA sites:

13%-54% (Seal et al, 2007; Hawkins et al, 2010)

37.8% VA post-deployment clinic (Jakupcak, 2008)

In-common Symptoms:

Decreased concentration

Agitation/irritability

Insomnia

Social isolation and detachment

Impaired memory

Affect and Mood disturbances

Clinical Practice Guidelines: Post Traumatic Stress Disorder Substance Use Disorders

VA/DoD Clinical Practice Guideline

**Management of
Post-Traumatic Stress**

Version 2.0

GUIDELINE SUMMARY

2010



VA/DoD Evidence Based Practice

Clinical Practice Guideline

SUMMARY

**Management of
Substance Use Disorders (SUD)**

August, 2009



VA/DoD Evidence Based Practice

www.healthquality.va.gov

Cognitive Issues: adjust PTSD Rx for TBI

- Present information at slower pace
- For group: do not put “on the spot”; Allow to freely contribute or ask PTSD only to respond 1st; then ask dually dx to respond.
- Use structured intervention approach with agenda, outline, or handouts.
- Use refocus/redirection to topic or short sessions with breaks.
- Provide a clear transition between topics. Use agenda, outline, or handout.
- The therapist can frustrate the mTBI patient in trying to fully recall an event that was only partially encoded.

Practice Recommendations for the Treatment of Veterans with Co-morbid PTSD, mild TBI, and Pain:

http://www.mirecc.va.gov/docs/visn6/Report_Consensus_Conf_Practice_Recommend_TBI_PTSD_Pain.pdf



Poll Question # 3:

Future Directions: your opinion

- What do you think would be the best next step for continued public education on prevention of TBI?
 - A. Television public service announcements aimed at prevention
 - B. Social Media
 - C. Add to elementary/high school health class curriculum
 - D. PCs as educators (discuss with patients)



VISN 6 Mid-Atlantic MIRECC *Post Deployment Mental Health*



www.mirecc.va.gov/visn6



VISN 6 Mid-Atlantic MIRECC Post Deployment Mental Health



Quick Guide - Patient/ Family: Traumatic Brain Injury



Brain injuries are the "signature wounds" of our Global War on Terrorism. Returning combat veterans may not know they have suffered such a wound. That is why VA doctors want these "new warriors" and their families to have this information.

If the head is hit or shaken, a "concussion" or "closed head injury" can result. Concussion is seldom life threatening, so doctors often use the term "mild" when the person is only dazed or confused or loses consciousness for a short time. However, concussion can result in serious symptoms. People who survive multiple concussions may have more serious problems.

Common Symptoms of Brain Injury

- ★ "I just don't feel like myself"
- ★ Feeling light-headed or dizzy
- ★ Difficulty organizing daily tasks
- ★ Blurred vision or eyes tire easily
- ★ Headaches or ringing in the ears
- ★ Feeling sad, anxious or listless
- ★ Easily irritated or angered
- ★ Feeling tired all the time
- ★ Trouble with memory, attention, or concentration
- ★ More sensitive to sounds, lights or distractions
- ★ Impaired decision making or problem solving
- ★ Difficulty inhibiting behavior - impulsive
- ★ Slowed thinking, moving, speaking or reading
- ★ Easily confused, feeling easily overwhelmed
- ★ Change in sleep - much more or much less
- ★ Change in sexual interest or behavior

People who have had a concussion may say that they are "fine" although their behavior or personality has changed. If you notice such changes in a family member or friend, suggest they get medical help.

Recovery Following Brain Injury

Some symptoms may be present immediately. Others may appear much later. People experience brain injuries differently. Speed of recovery varies from person to person. Most people with mild injuries recover fully, but it can take time. In general, recovery is slower in older persons. People with a previous brain injury may find that it takes longer to recover from their current injury. Some symptoms can last for days, weeks, or longer.

Talk to your health care provider about any troubling symptoms or problems.

To Promote Healing & Manage Symptoms

Things That Can Help

- ★ Get plenty of rest & sleep
- ★ Increase activity slowly
- ★ Carry a notebook - write things down if you have trouble remembering
- ★ Establish a regular daily routine to structure activities
- ★ Do only one thing at a time if you are easily distracted - turn off the TV or radio while you work
- ★ Check with someone you trust when making decisions

Things That Can Hurt

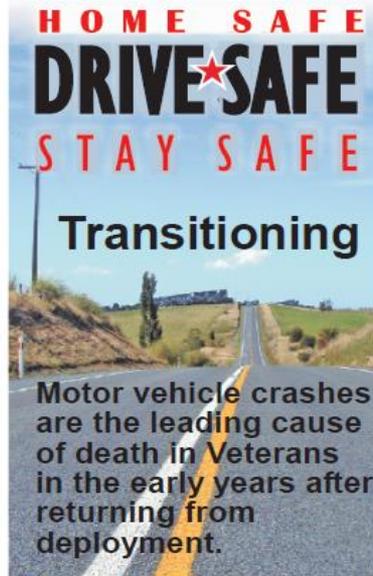
- ★ Avoid activities that could lead to another brain injury - examples include contact sports, motorcycles, skiing
- ★ Avoid alcohol as it may slow healing of the injury
- ★ Avoid caffeine or "energy-enhancing" products as they may increase symptoms
- ★ Avoid pseudoephedrine-containing products as they may increase symptoms - check the labels on cough, cold, and allergy medicines
- ★ Avoid excessive use of over-the-counter sleeping aids - they can slow thinking and memory

Resources for More Information & Help: Centers for Disease Control <http://www.cdc.gov/nicipo/tbi>
 Defense & Veterans Brain Injury Center <http://www.dvbic.org>
 Brain Injury Association <http://www.biausa.org>



Quick Guide - Patient/Family Readjustment

Military personnel are deeply affected by their war experiences. Adjustment difficulties are common. These are normal reactions to abnormal experiences. This series of brochures deal with issues that are common following deployment. Remember - identifying your problem areas and seeking help is a sign of strength, not weakness. It means you are actively coping with your challenges.



Motor vehicle crashes are the leading cause of death in Veterans in the early years after returning from deployment.



Quick Guide - Patient/Family Readjustment

Military personnel are deeply affected by their war experiences. Adjustment difficulties are common. These are normal reactions to abnormal experiences. This series of brochures deal with issues that are common following deployment. Remember - identifying your problem areas and seeking help is a sign of strength, not weakness. It means you are actively coping with your challenges.

Building Relationships



WWW.MIRECC.va.gov/VISN6/



VISN 6 Mid-Atlantic MIRECC Post Deployment Mental Health



VISN 6 > Education > Teaching Tools & Tips



VISN 6
*Post Deployment
Mental Health*

Another area of interest for us is development of new materials and approaches for presentation of complex information, such as functional

anatomy of the brain.

jump to: [Education Home](#) | [Readjustment Challenges](#) | [TBI](#) | [Newsletters](#)

Teaching Cases

Applying classroom-derived knowledge of functional anatomy to clinical practice is quite challenging for most learners. Educational research strongly supports the use of guided experiences - in which an expert explicitly draws the learner's attention to key connections - to promote the creation of active (useable) knowledge. This approach helps the learner establish connections between functional neuroanatomy and clinical practice, deepens their interest in the individual aspects of each patient, and enhances their appreciation of pathology and prognosis.

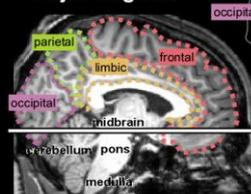
Case 1: Amnestic Disorder and Depression due to Cerebral Aneurysm and TBI

Case 2: Traumatic Brain Injury, Post-Traumatic Stress Disorder, and Headache

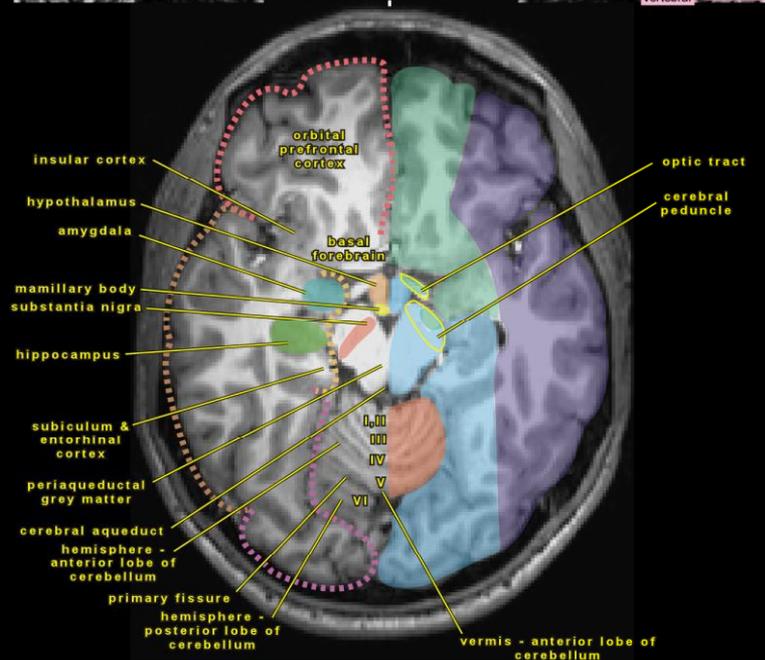
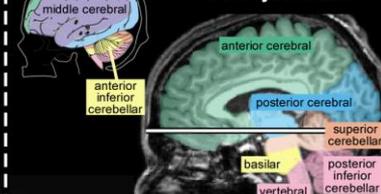
Case 3: Anger and Irritability 6 Years After Blast Injury

Case 4: Multiple Blast-Related Brain Injuries with Co-Morbidities

Cerebral Lobes & Major Regions



Arterial Territories & Major Tracts



WWW.MIRECC.va.gov/VISN6/

OK: so what don't we know....

- Is combat-related injury similar to or different from civilian TBI in long-term outcomes?
- In which cases will early deficits become permanent?
- Can objective testing be developed to identify any long-term deficits from mild combat-related TBI?
- Can we use the sports-related TBI literature as a guide?
- What are the best assessment strategies/tools for evaluation of patients with mild TBI, PTSD, and chronic pain?
- What are the best acute and longer term treatment protocols?
- What is the prognosis?

Current Resources Available

- Current Clinical Practice Guidelines at www.healthquality.va.gov
- TBI-PTSD Consensus Conference Summary:
www.ptsd.va.gov/professional/pages/traumatic-brain-injury-ptsd.asp
- New Evidence-Based Synthesis Report – Assessment and Treatment of Individuals with History of TBI and PTSD (August, 2009) at www.hsrd.research.va.gov/publications/esp/
- National Center for PTSD - www.ptsd.va.gov
- Information regarding outpatient cognitive rehabilitation programs (e.g. Phoenix, San Diego, and Salisbury) available upon request.
- MIRECC's and Centers of Excellence at WWW.MIRECC.va.gov
- Brain Injury Association – www.biausa.org

Together we can make a difference!
Thank you!

Robin A. Hurley, MD
robin.hurley@va.gov
www.mirecc.va.gov/visn6
704-638-9000 ext 4455