



DEFENSE CENTERS OF EXCELLENCE
For Psychological Health & Traumatic Brain Injury

Concussion Care In a Deployed Setting

Sidney R. Hinds II
COL, MC, USA

National Director, Defense and Veterans Brain Injury Center





Purpose and Outline

- **Purpose:** to provide a discussion of theater concussion care 2012-13
- **Outline:**
 - DoD TBI incidence
 - Theater roles and responsibilities
 - Concussion care centers
 - Rationale for care provided



Department of Defense TBI Incidence

Annual Department of Defense TBI Diagnoses (All Severities) 2000 – 2013 (Q2)	
Year	Number
2000	10,958
2001	11,619
2002	12,407
2003	12,815
2004	14,469
2005	15,531
2006	17,037
2007	23,217
2008	28,462
2009	28,877
2010	29,188
2011	32,625
2012	30,406
2013 (Q2)	13,123
Total	280,734

Source: Armed Forces Health Surveillance Center (AFHSC), Data ending June 2013, currents as of 1 Aug 2013.

**84.3% of all TBIs
are non-
deployment related**

**82.4% of all TBIs
are mild /
concussion**



The Role of the Neurologist in Theater

- **Clinician**
 - **Consultant**
 - **Educator**
- **Advisor**
 - **Diplomat**
 - **Facilitator**



Multi-disciplinary approach

- **Neurologist**
 - **Primary Care**
 - **Occupational Therapists (OT)**
 - **Neuropsychologists**
- **Radiologist**
 - **Hospital and/or Medical Brigade Commander**



Background: Theater Concussion Care

- **Since 2012: ~97% return to duty (RTD) rate**
 - Mandatory event-driven concussion screening and evaluation
 - Standardized screening and assessment tools
 - Emphasis: Treat concussed SM close to unit; maintain in theater
 - Enforce strict supervised physical & mental rest
- **Events and approach are defined by DoDI 6490.11 (Replaced DTM 09-033)**

The Department of Defense Instruction (DoDI) 6490.11, signed September 18, 2012, mandates Service members involved in potentially concussive events in the deployed setting be screened, identified, and treated promptly for concussion in accordance to the Clinical Management Algorithms in the Deployed Setting (2012). The DoDI also identifies specific reporting requirements so that Service members who have been exposed to potentially concussive events are identified and tracked.



Mandatory Event Screening & Reporting

Any Service member in a vehicle associated with a blast event, collision, or rollover

Presence within 50 meters of a blast (inside or outside)

A direct blow to the head or witnessed loss of consciousness

Exposure to more than one blast event (the Service member's commander shall direct a medical evaluation)

Mandatory
24-hour
downtime*
&
medical
evaluation

* Commanders may delay or postpone 24-hour downtime based on mission requirements

•Reference: Department of Defense Instructions (DoDI) 6490.11



DoD Definition of TBI

A concussion occurs when two conditions are met:

- An injury event

AND at least one of the following

- An alteration of consciousness (AOC) lasting < 24 hours
- A loss of consciousness (LOC) lasting < 30 minutes
- Post-traumatic amnesia (PTA) caused by the injury event lasting < 24 hours



TBI Classification

Severity	Mild (Concussion)	Moderate	Severe
Structural Imaging	Normal	Normal or abnormal	Normal or abnormal
Loss of consciousness (LOC)	0 to 30 minutes	30 minutes and < 24 hours	> 24 hours
Alteration of consciousness (AOC)	a moment up to 24 hours	> 24 hours	
Post traumatic amnesia (PTA)	0 to 1 day	> 1 day < 7 days	> 7 days

This classification refers to severity at the time of injury, not symptoms experienced



Diagnosing Concussion

Key Points:

- LOC is NOT required for the diagnosis of concussion
- Symptoms alone (such as headache) do NOT equate to a concussion diagnosis

Two conditions must be met before a concussion can be diagnosed:

1. An injury event

AND

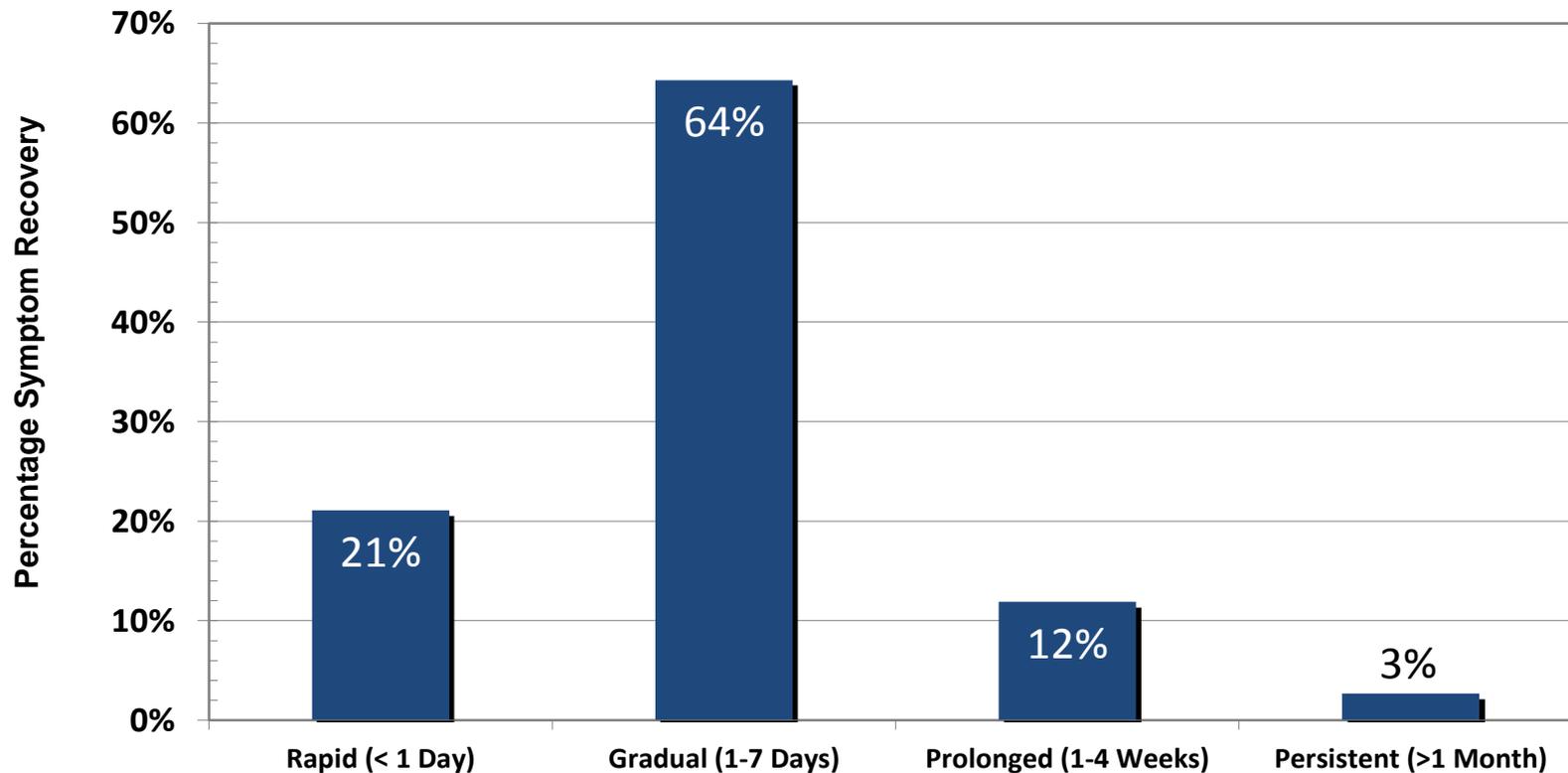
2. At least one of the following:

- An alteration of consciousness (AOC), even momentary
- A loss of consciousness (LOC) lasting < 30 minutes
- Post-traumatic amnesia (PTA) caused by the injury event lasting < 24 hours

Reference: [Department of Defense Instructions \(DoDI\) 6490.11](#)



Distribution of Post-concussion Symptom Recovery



Percentage Symptom Recovery in Concussed Athletes (N = 635*)

*McCrea, 2009



What Activities HELP Brain Recovery Following a Concussion?

Cognitive/Thinking

- Maximize downtime or rest during the day
- Adequate sleep routines
 - Keep sleeping quarters quiet and dark
 - Get six to eight hours of sleep



Physical

- Keep the heart rate low
 - Stay out of the heat
 - Limit physical activity
 - Get adequate sleep
 - Drink plenty of water



What Activities HURT Brain Recovery Following a Concussion?

Cognitive/Thinking

- Mental exertion
 - Writing reports
 - Activities requiring intense concentration
- Inadequate sleep
 - Caffeine or “energy enhancers”
 - Interfere with proper sleep
 - Prevent relaxation



Physical

- Physical exertion
 - Working
 - Heavy lifting
 - Exercising
- Physical activities that increase risk for a second concussion
 - Combatives
 - Sports



Leadership Assessment

Commanders are required to report everyone involved in a mandatory event using the I.E.D. and H.E.A.D.S. checklist

Injury

- Physical damage to SM body or body part?

Evaluation (H.E.A.D.S)

- H – Headache and/or vomiting
- E – Ears ringing
- A – Amnesia, alteration or loss consciousness
- D – Double vision and/or dizziness
- S – Something feels wrong or is not right

Distance

- Was SM within 50M of blast?
- Record the distance from blast for ALL SM



2012 mTBI Screening & Assessment Tools

Military Acute Concussion Evaluation (MACE)



MACE

Military Acute Concussion Evaluation



Patient Name: _____
 Service Member ID#: _____ Unit: _____
 Date of Injury: _____ Time of Injury: _____
 Examiner: _____
 Date of Evaluation: _____ Time of Evaluation: _____

CONCUSSION SCREENING
 Complete this section to determine if there was both an injury event AND an alteration of consciousness.

1. Description of Incident

A. Record the event as described by the service member or witness.
 Use open-ended questions to get as much detail as possible.

_____ Key questions:
 • Can you tell me what you remember?
 • What happened?

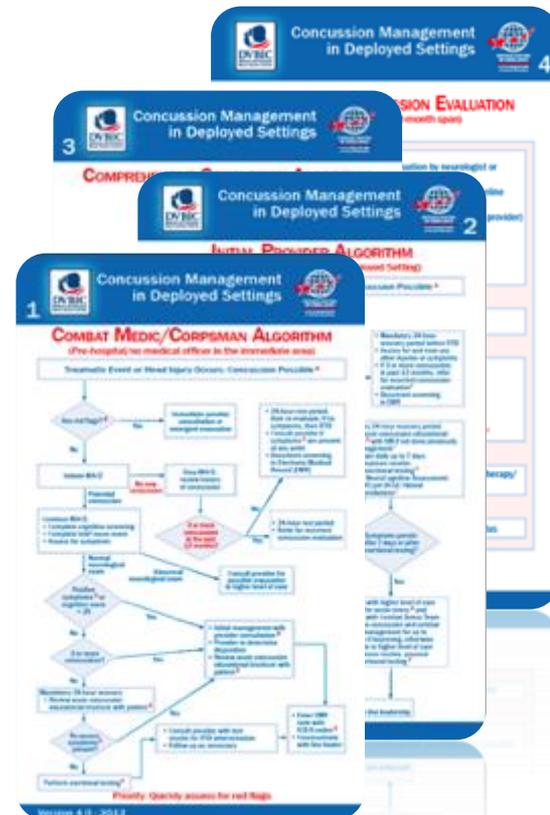
B. Record the type of event.
 Check all that apply.

Explosion/Blast Fragment Motor Vehicle Crash
 Blunt Object Sports Injury Gunshot Wound
 Fall Other _____

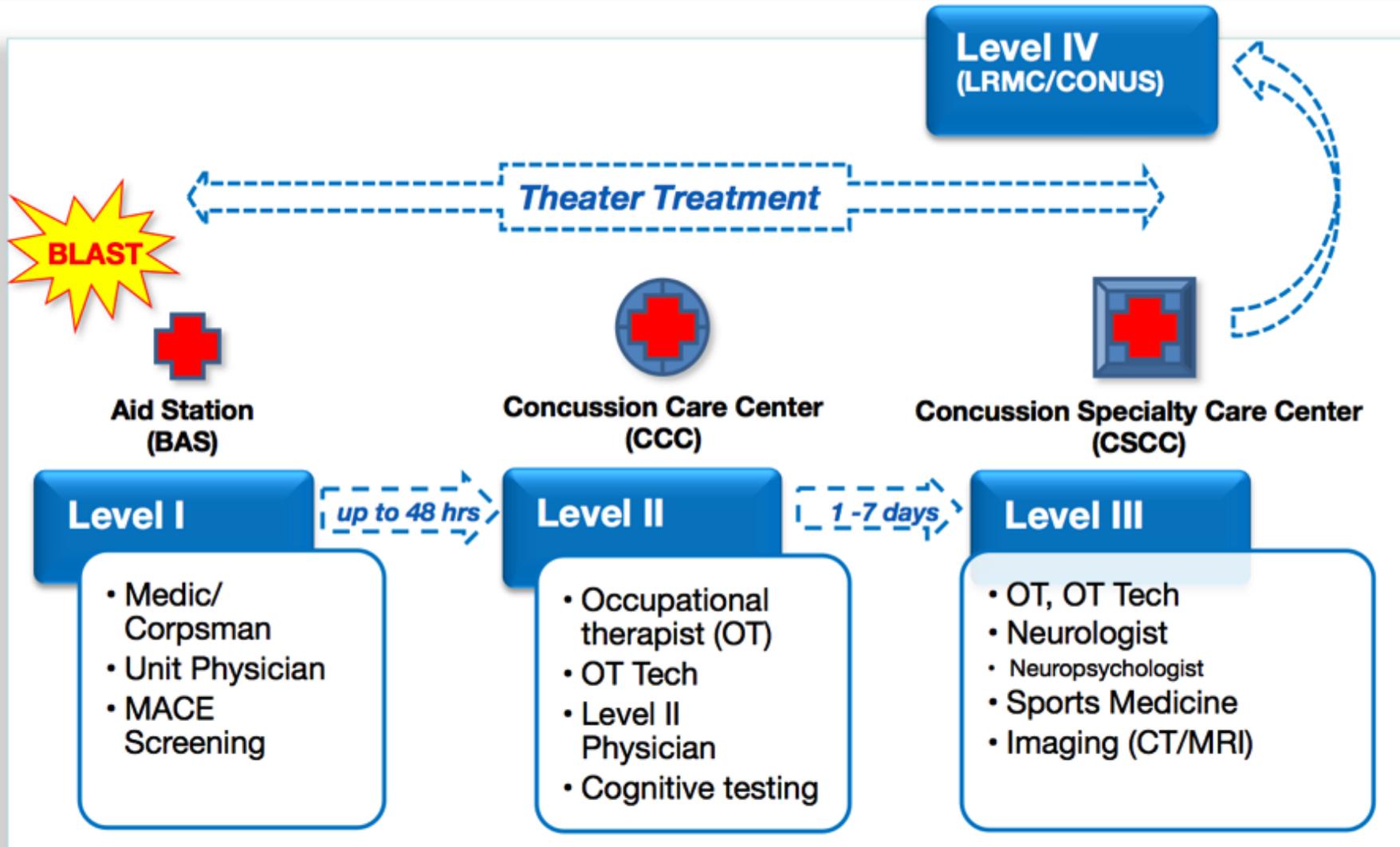
C. Was there a head injury event? Key questions:
 YES NO
 • Did your head hit any objects?
 • Did any objects strike your head?
 • Did you feel a blast wave?
 (A blast wave that is felt striking the body/head is considered a blow to the head.)

Release 01/2012 info@dvbc.org Page 1 of 8

Concussion Management Algorithms

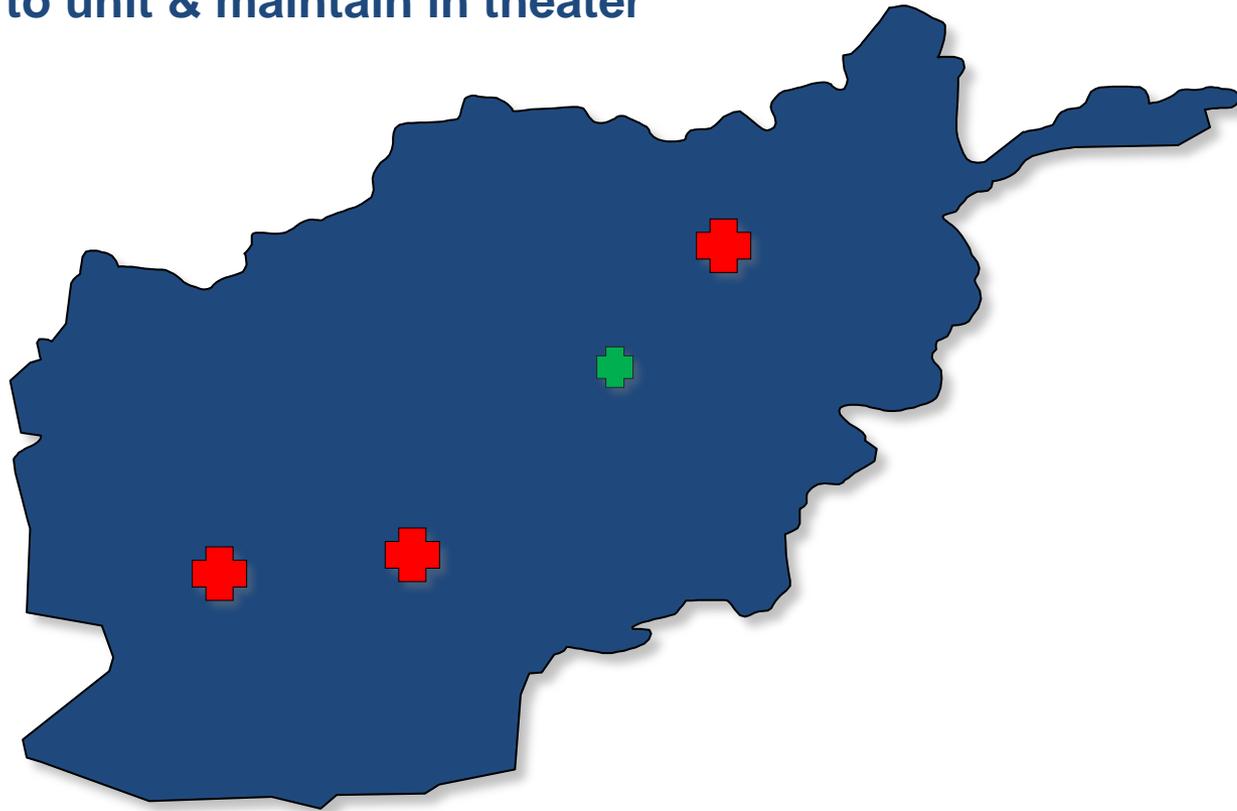


The Concussion Care Center Model



Theater Concussion Care Centers

Goal: Treat concussed Service Members close to unit & maintain in theater



 Role III Concussion Care Specialty Centers

 Role II Concussion Care Centers

*Sept. 2013



Medical and Line Unit Responsibilities

DoDI 6490.11 Tracking Requirement

Medical Personnel

Line Unit Personnel

**Concussion Screening
(MACE)
24 Hour Follow-Up**

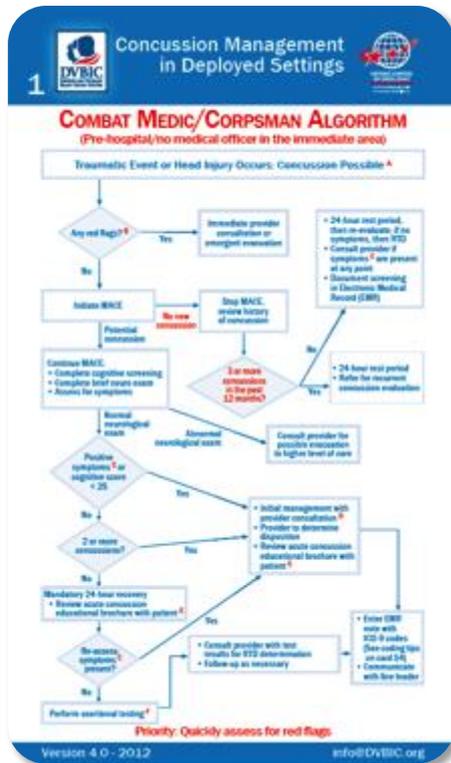
BECIR

VALIDATE



Combat Medic, Corpsman or Provider

- Documentation of head trauma, symptoms, immediate treatment
- MACE Card
- Reports back to the next higher responsible Medical Corps Officer in level I or level II



Clinical Practice Guideline (CPG)
Derived from DTM 09-033

MACE card;
supports the CPG



Medical Corps Officer

- **Reviewing and/or documenting the concussion/TBI in the electronic medical record.**
- **Determination of concussion or not**
- **Detail treatment for concussion**
- **Referral to the concussion care center (CCC)**
- **Disposition from the CCC**



Medical Corps Officer (MCO): Responsibilities to the Command

- Only a MCO's medical record documentation will be accepted for Purple Heart submissions
- Reviewing and/or documenting the concussion/TBI in the electronic medical record.
 - Determination of concussion or not
 - Detail treatment for concussion
 - Agree with referral and/or refer to the concussion care center (CCC)
- **Per USAFOR-A**
 - Unit MCO reviews SMs medical record
 - Authors memorandum to the unit commander
 - Agrees or disagrees with Purple Heart recommendation

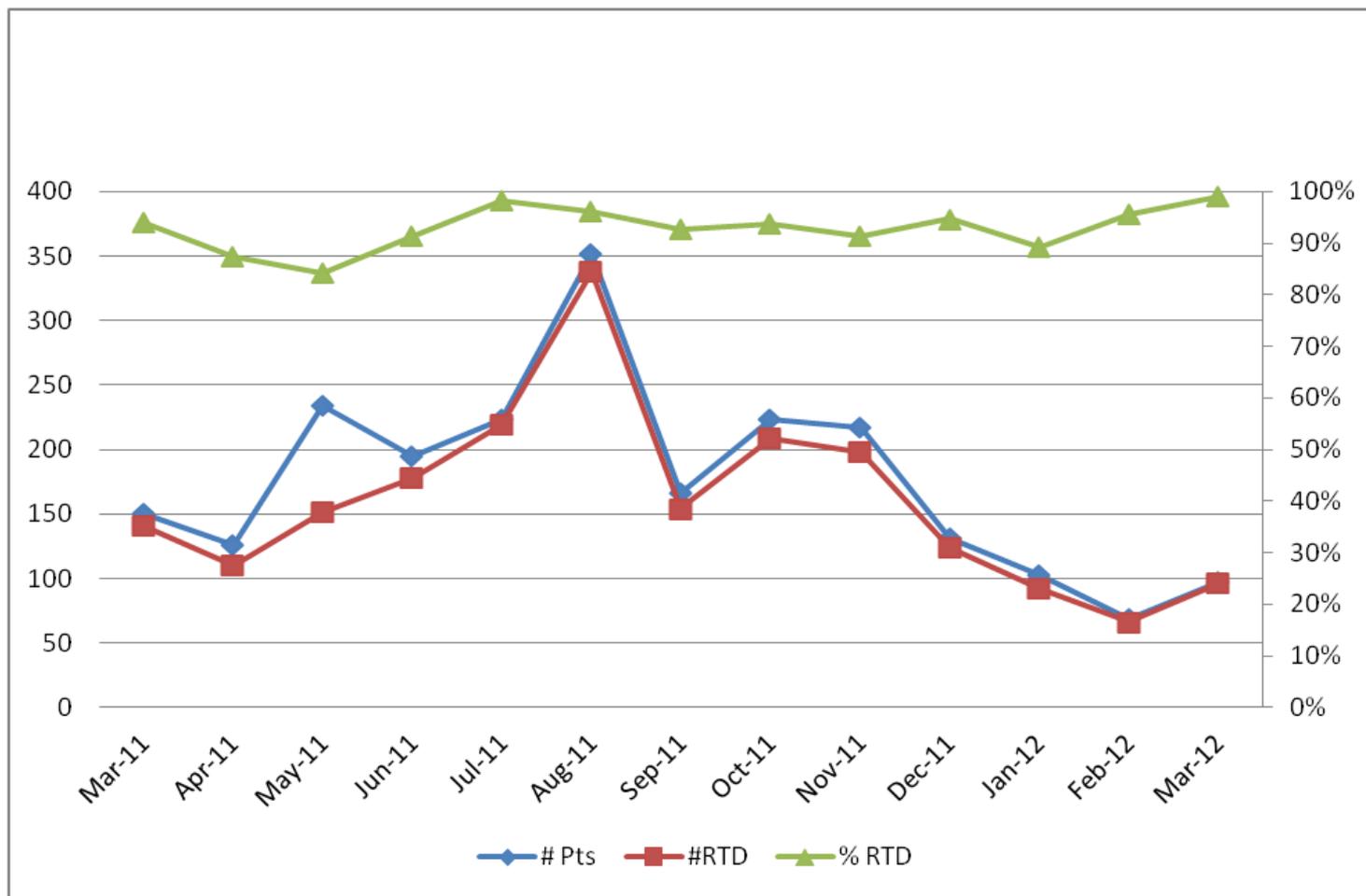


Concussion Care Center (CCC)

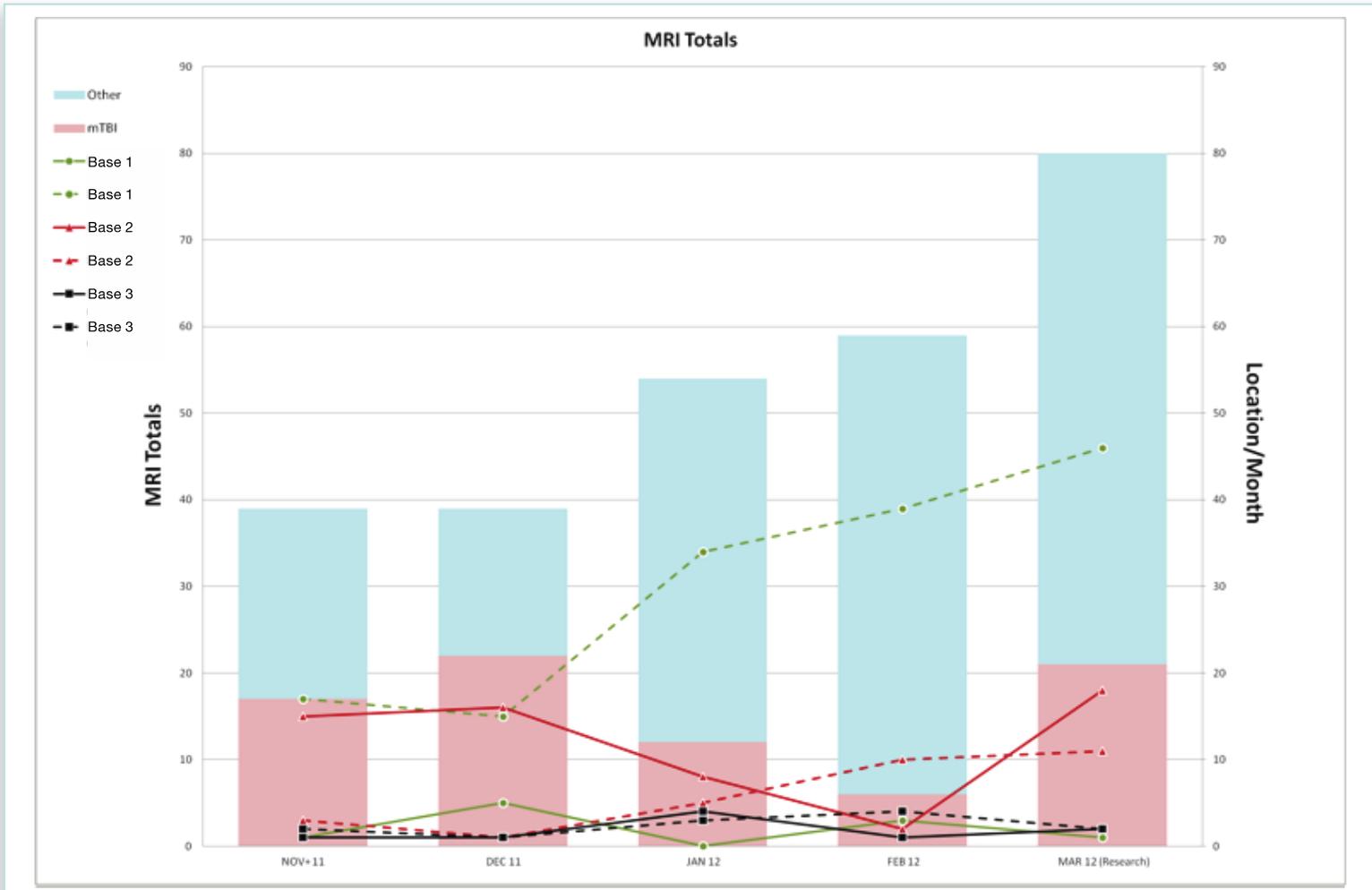
- **Not all patients will require treatment at CCC**
...yet still qualify as having a concussion
- **Need to have a diagnosis of concussion to be admitted**
- **Inpatient and outpatient capabilities**
 - Level II OT and OT technologists
 - Level III OT and OT technologists with...
 - Access to subspecialty care
 - Neurologist
 - Neuropsychologist
 - Automated Neurological Assessment Metric (ANAM) available at all CCCs



Theater mTBI workload at Concussion Care Centers March 2011-2012



MRI Usage in Theater



Summary

- **Overview**
 - **History**
 - **Definition**
- **Evaluation**
 - **Responsibilities**
 - **Questions**



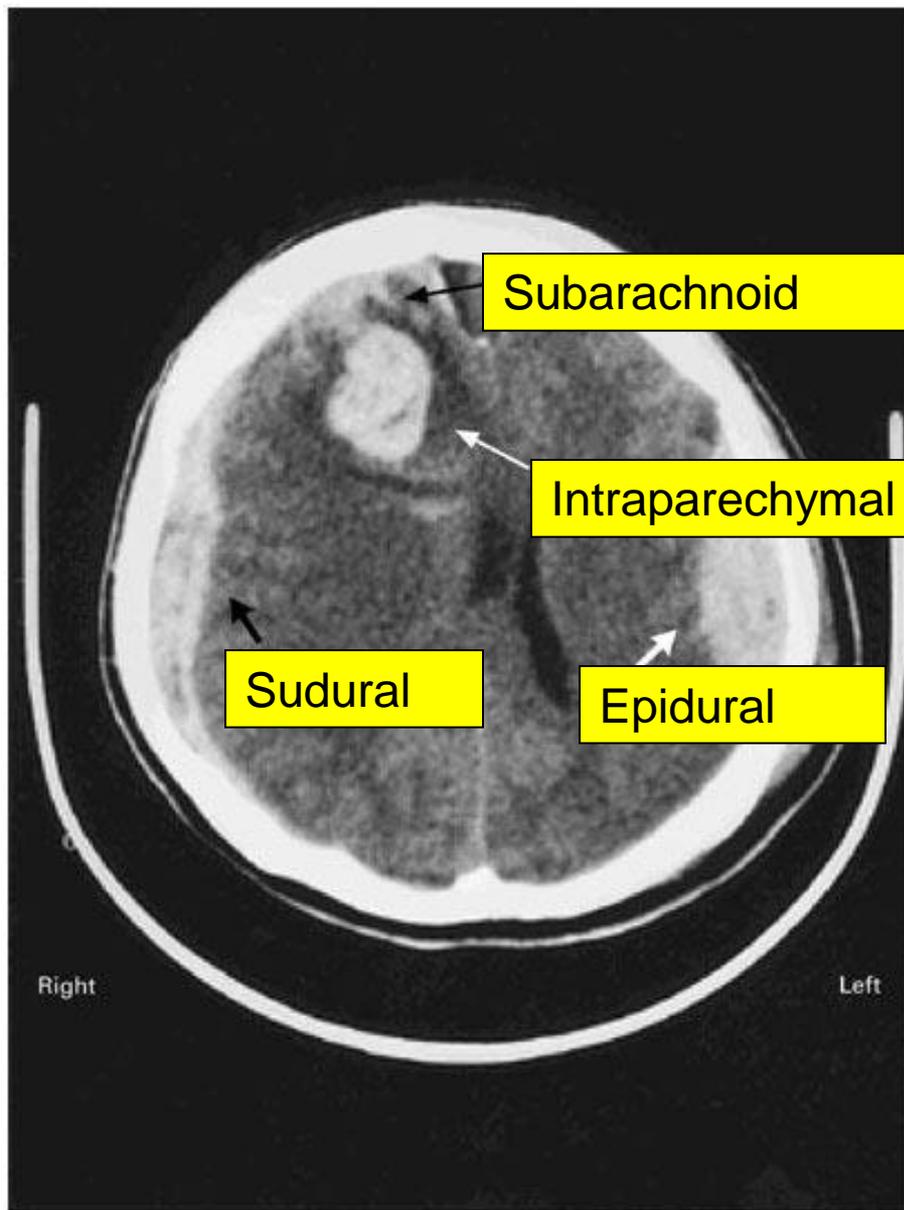
References

- **DTM 09-033:**
http://www.dtic.mil/whs/directive/corres/pdf/DTM-09-033_placeholder.pdf (CAC enabled only)
 - **DODI 6490.11**
 - **USFOR-A Policy #40**
 - **DCE: <http://www.dcoe.mil/>**
- **DVBIC: www.dvbic.org or info@dvbic.org**
 - **TBI coding fact sheet**
 - **TBI videos and presentations – <https://atn.army.mil>**
 - **Department of Defense Instructions (DoDI) 6490.11**



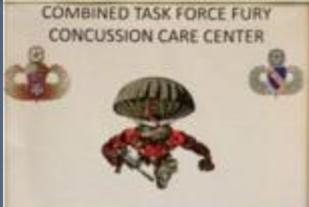
Extra slides





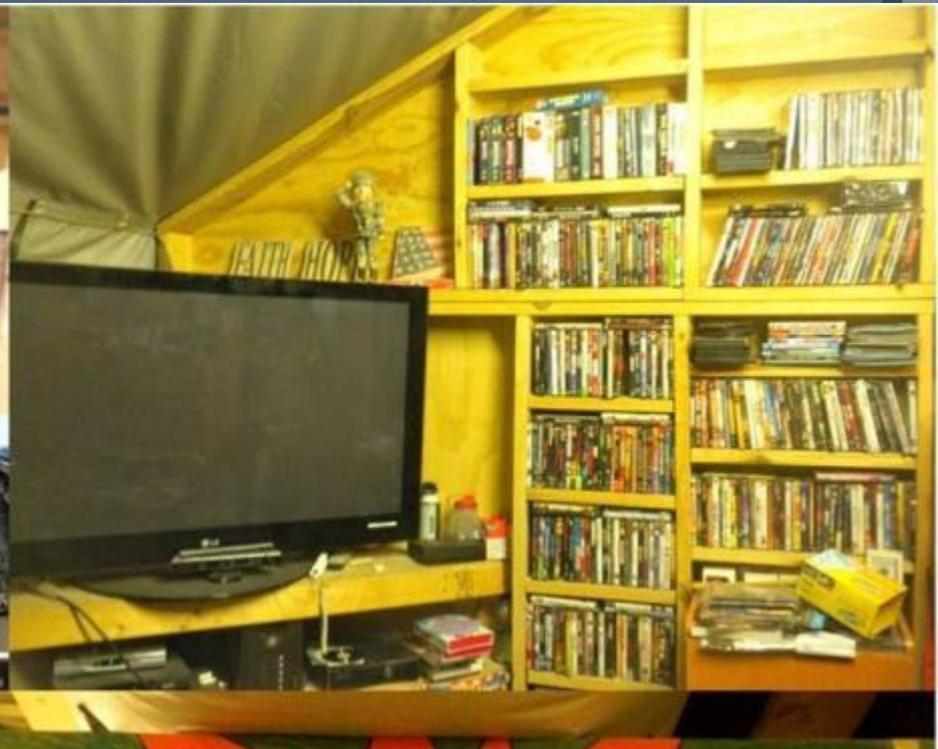
Four Types of Acute Post-Traumatic Intracranial Hemorrhage, NEJM 2001;
344:580, February 22, 2001

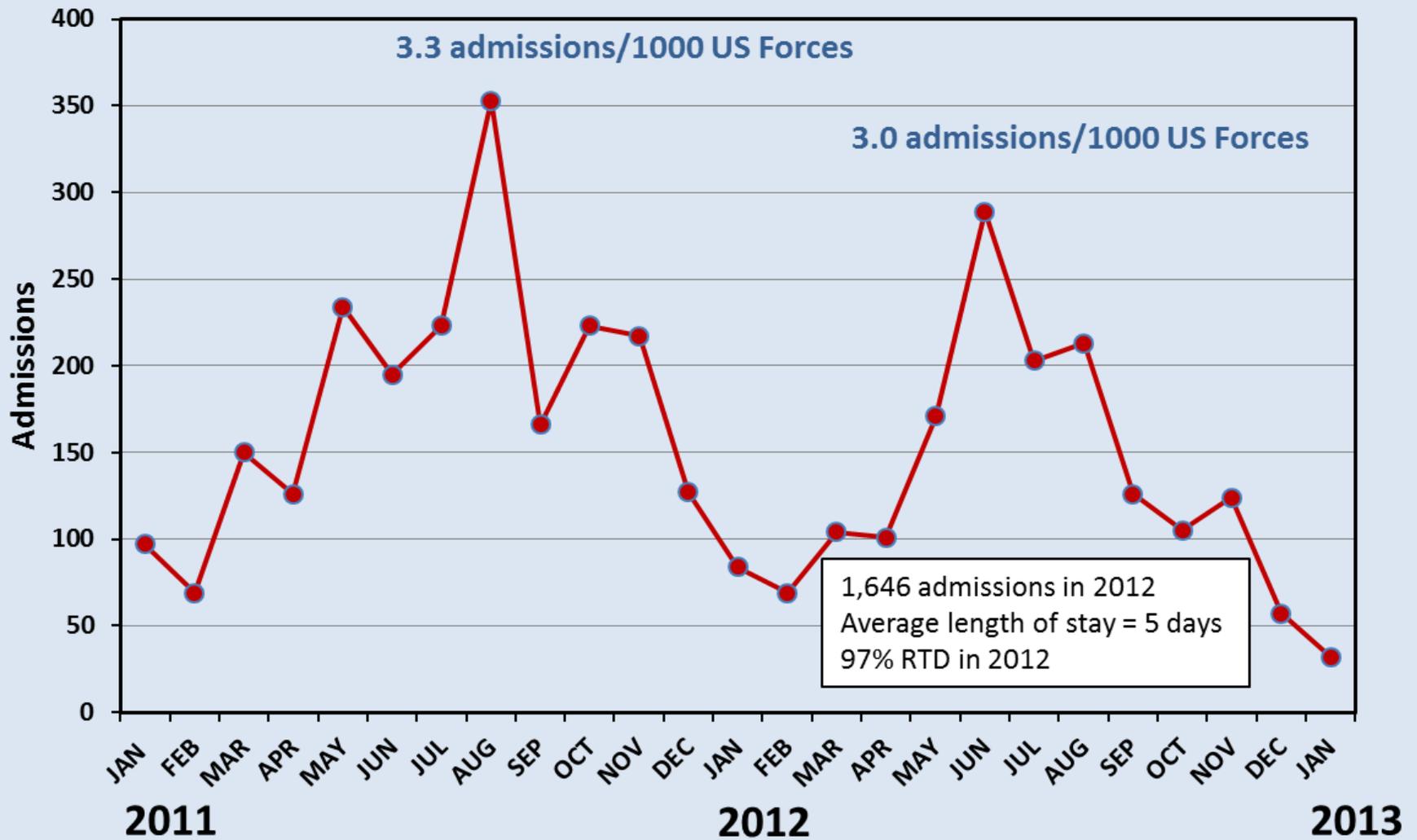




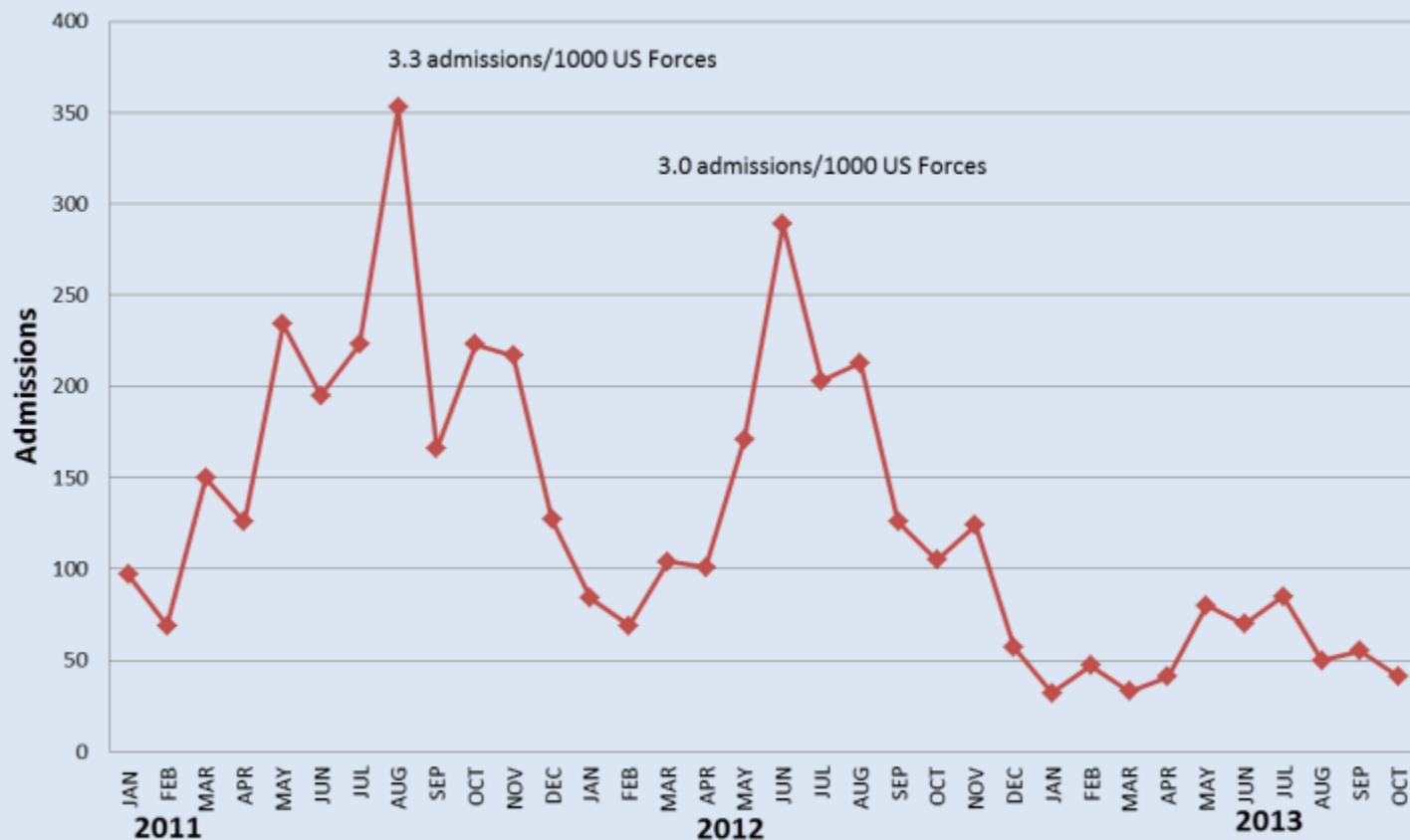
FURY FROM THE SKY!





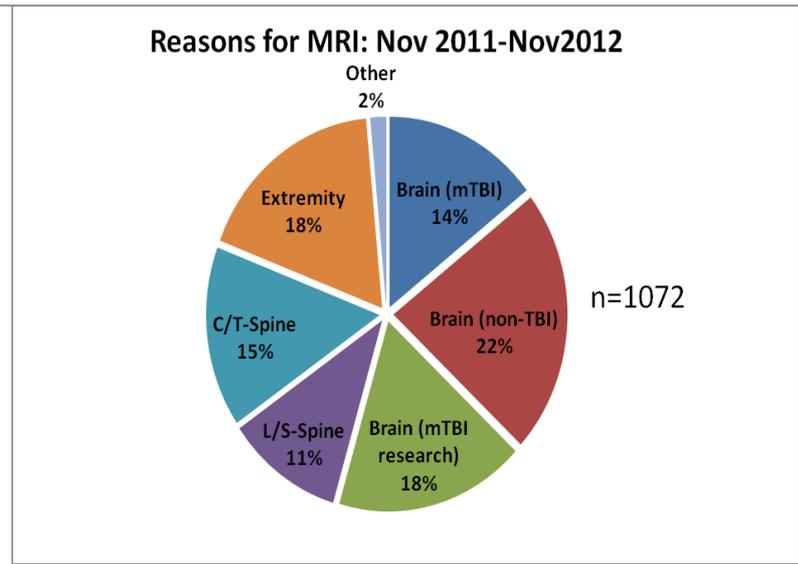
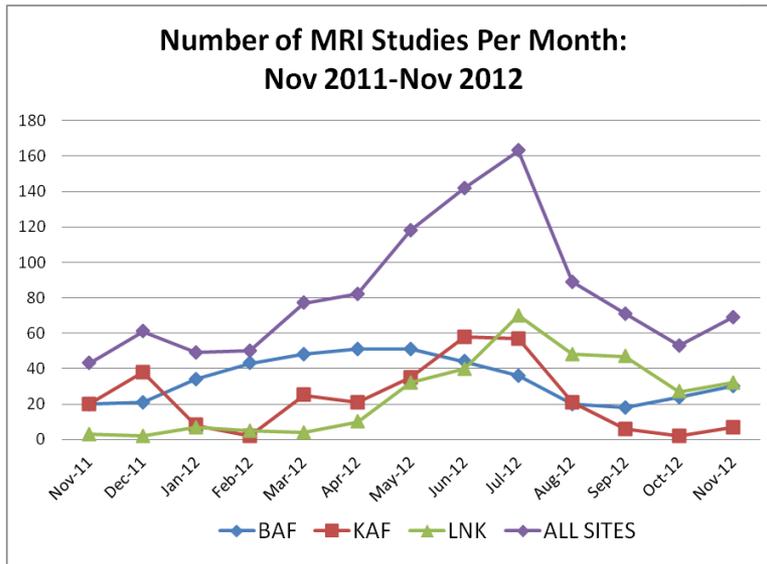


Monthly Admissions to CCCs



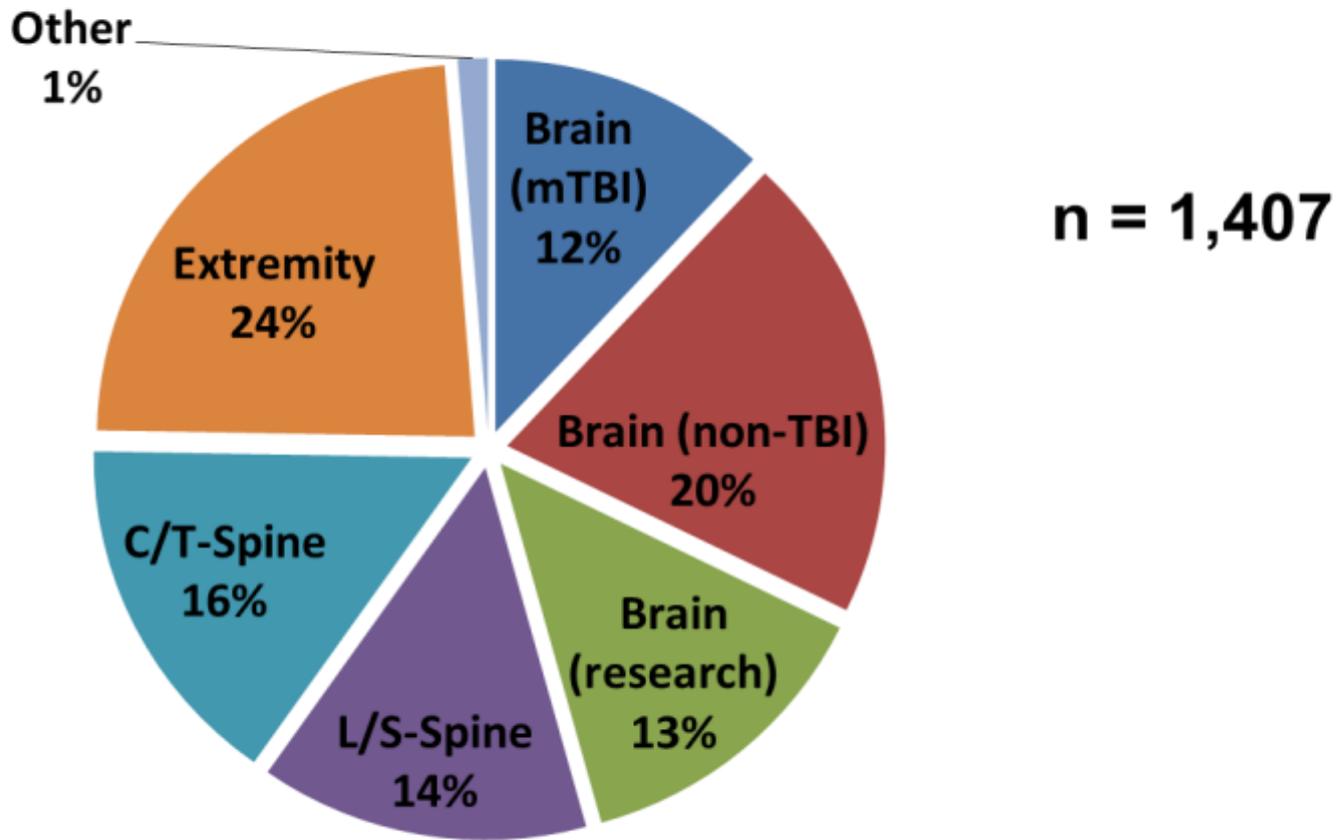
MRIs in Theater

- 1,072 MRI studies performed between NOV 2011- NOV 2012: BAF 440, KAF 300, LNK/Bastion 327.
- 32% of studies are done for mTBI, including mTBI research
- Estimated 3% of brain MRI studies for mTBI/concussion showed abnormalities caused by trauma.
- MRI facilitates earlier diagnosis in theater and more precise determination of prognosis, treatment, and patient disposition for neurologic and orthopedic conditions.
- Rarely required for “life or limb threatening” emergencies.
- MRI removed in Spring 2013



Magnetic Resonance Imaging

MRI Utilization: Nov 2011 - Feb 2013



mTBI AIM Form

<< >> AIM - MACE 02-2012 JNR AutoNeg Undo Details Browse Shift Browse Note View

Concussion Screening (1-2) Cognitive Exam (3-4) Neurologic Exam (5-8) Cognitive Exam part 2 (9-10) Symptom Screening (11) JNR Additional Information and Coding Tips

MACE Version 02/2012

Concussion Screening: Complete this section to determine if there was both an injury event AND an alteration of consciousness.

Date/Time of Injury Onset @

1. Description of Event

A. Record the event as described by the service member or witness.

Can you tell me what you remember?
What happened?

Use open ended questions to get as much detail as possible.
Key questions:
-Can you tell me what you remember?
-What happened?

B. Record the type of event (Check all that apply)

<input checked="" type="checkbox"/> Explosion/Blast	<input type="checkbox"/>	<input checked="" type="checkbox"/> Fragment	<input type="checkbox"/>	<input checked="" type="checkbox"/> Motor Vehicle Crash	<input type="checkbox"/>
<input checked="" type="checkbox"/> Blunt object	<input type="checkbox"/>	<input checked="" type="checkbox"/> Sport Injury	<input type="checkbox"/>	<input checked="" type="checkbox"/> Gunshot Wound	<input type="checkbox"/>
<input checked="" type="checkbox"/> Fall	<input type="checkbox"/>	<input checked="" type="checkbox"/> Other	<input type="text"/>		

C. Was there a head injury event?

Key questions:
-Did your head hit any objects?
-Did any objects strike your head?
-Did you feel a blast wave? (A blast wave that is felt striking the body/head is considered a blow to the head)

2. Alterations of Consciousness or Memory (AOC/LOC/PTA)

A. Was there Alteration of Consciousness (AOC)?
AOC is temporary confusion or 'having your bell rung'.

[] minutes

Key question:
-Were you dazed, confused, or did you see stars immediately after the injury?

B. Was there Loss of Consciousness (LOC)? (min)

LOC is temporarily passing out or blacking out.

[] minutes

Key question:
-Did you pass out or black out?

C. Was there any Post Traumatic Amnesia (PTA)?
PTA is a problem remembering part or all of the injury events.

[] minutes
What is the last thing you remember before the event?
What is the first thing you remember after the event?

Key questions:
-What is the last thing you remember before the event?



Concussion Care Center

Assessments and Interventions

Assessments

- Confirm history and diagnosis
- Post-concussion symptoms
- Acute stress reaction screening
- Balance Error Scoring System (BESS)
- Functional evaluation
- (ANAM)
- Exertion test

Interventions

- Supervised rest
- Sleep hygiene
- Relaxation techniques
- Concussion education
- Behavioral health consultation
- Balance training
- Headache treatment by MD
- Cognitive therapy
- [Graded return to activity](#)



BECIR/MACE QA Tools

