

## Military Acute Concussion Evaluation (MACE) Information Paper

**Military Acute Concussion Evaluation (MACE):** Screening test designed for the acute evaluation of concussion. The instrument is currently the only standardized and most widely used method for evaluation of acute mild TBI (otherwise known as concussion) in military operational settings

**MACE Development:** The MACE was developed after deployed providers requested a tool that would quickly yet efficiently screen and evaluate a troop in which concussion was suspected. The Defense and Veterans Brain Injury Center (DVBIC) developed the tool in conjunction with nationally known experts in sports concussion. In August 2006, the MACE was deployed.

**MACE Domains:** The MACE consists of three main components: history & symptoms, neurological evaluation, and a cognitive screen with objective score. The history section identifies the mechanism of the traumatic event, use of protective gear, and establishes the presence or absence of any alteration or loss of consciousness. The neurological exam is a brief clinical exam that evaluates for signs of neurologic dysfunction. Finally, the cognitive component evaluates orientation, immediate recall, concentration and delayed recall.

**MACE Administration:** The MACE can be administered by any level of medical provider (medic/corpsman to physician) when there is suspicion of concussion. It is given only if the following two criteria are met: exposure to injury event AND post injury presence of alteration of consciousness (AOC) or loss of consciousness (LOC). Ideally, the MACE is administered within the first 48-72 hours following injury. Follow-up scores are often obtained during post-injury evaluation to document improvement/deterioration in cognitive status. The MACE should also be administered after exertional testing in the determination of the safe return to duty.

### Widespread Use of MACE:

- Recent OTSG data of in-theater providers revealed that
  - Of the patients evaluated for mTBI during the survey, more than 90% received a MACE
  - 70% of providers reported that results of the MACE are used in clinical decision-making.
- NATO allies Canada and the United Kingdom have adopted use of the MACE in their evaluation of mTBI/concussion.
- The Institute of Medicine Report on the Long-term Consequences of Traumatic Brain Injury (2008) recommended that the DoD continue to use the MACE screening for every service member with blast exposure.
- In-Theater Assessment Team (Gray Team) co-led by DVBIC/DCoE and JCS recently evaluated application of MACE in Iraq and Afghanistan. Recommendations to further improve its proper application are being reviewed.

### MACE Validation Efforts:

- Preliminary Validation of the MACE (Grant et al., 2008). Prospective validation study of the MACE.
- Assessment of Acute Concussion in a Combat Environment: Concurrent Validity, Sensitivity, and Specificity of the ANAM (Russell et al., in progress protocol IRAQ 09-001)
- Validation of the Military Acute Concussion Evaluation (MACE) for In-Theater Evaluation of Combat-Related Traumatic Brain Injury (McCrea, Jaffee et al., pending IRB approval).