Defense Health Board

Automated Neuropsychological Assessment Metrics Findings and Recommendations

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Defense Health Board Meeting
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Overview

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Charge

- Assess the effectiveness of baseline pre-deployment neurocognitive testing using the Automated Neuropsychological Assessment Metrics (ANAM) tool to determine the neurological deficits in function following a traumatic brain injury (TBI) event.

- Determine added value of supplemental sections on language, memory, attention, executive function, and cognition.

- Examine the value of including symptoms and patient history, mood and sleepiness scales, as well as, measures of response inhibition and effort.

Membership

- Dr. Charles Fogelman
- Dr. Richardean Benjamin
- Dr. Ross Bullock
- Dr. Robert Certain
- Dr. Christopher Colenda
- RADM Peter Delany
- Dr. John Fairbank

- Dr. Jesse Fann
- Dr. David Hovda
- Dr. Kurt Kroenke
- Dr. David Kupfer
- Dr. Brett Litz
- Dr. Shelley MacDermid Wadsworth
- Dr. James Campbell Quick
- Dr. Thomas Uhde

Recent Activities

- The Board suspended its examination of this issue due to the expiration of the TBI External Advisory Subcommittee member appointments.

- Following the March 7-8, 2011 DHB meeting, the Assistant Secretary of Defense (Health Affairs) (ASD(HA)) renewed the charge to the Board and the task was assumed by the Psychological Health External Advisory Subcommittee.

  - The Psychological Health External Advisory Subcommittee met on May 9, 2011 to develop a strategy to address the charge and again on June 16, 2011 to be briefed by SMEs and develop a draft response for consideration by the DHB.

Recent Activities (Continued)

June 16, 2011 Meeting

- ANAM Research, Implementation, and Demonstration - Dr. Robert Kane, Defense and Veterans Brain Injury Center (DVBIC)

- ANAM Development and Execution – Ms. Kathy Helmick, Traumatic Brain Injury, Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE)

- ANAM Policy Implications – Ms. Elizabeth Fudge, Force Health Protection and Readiness Programs, Office of the Assistant Secretary of Defense for Health Affairs
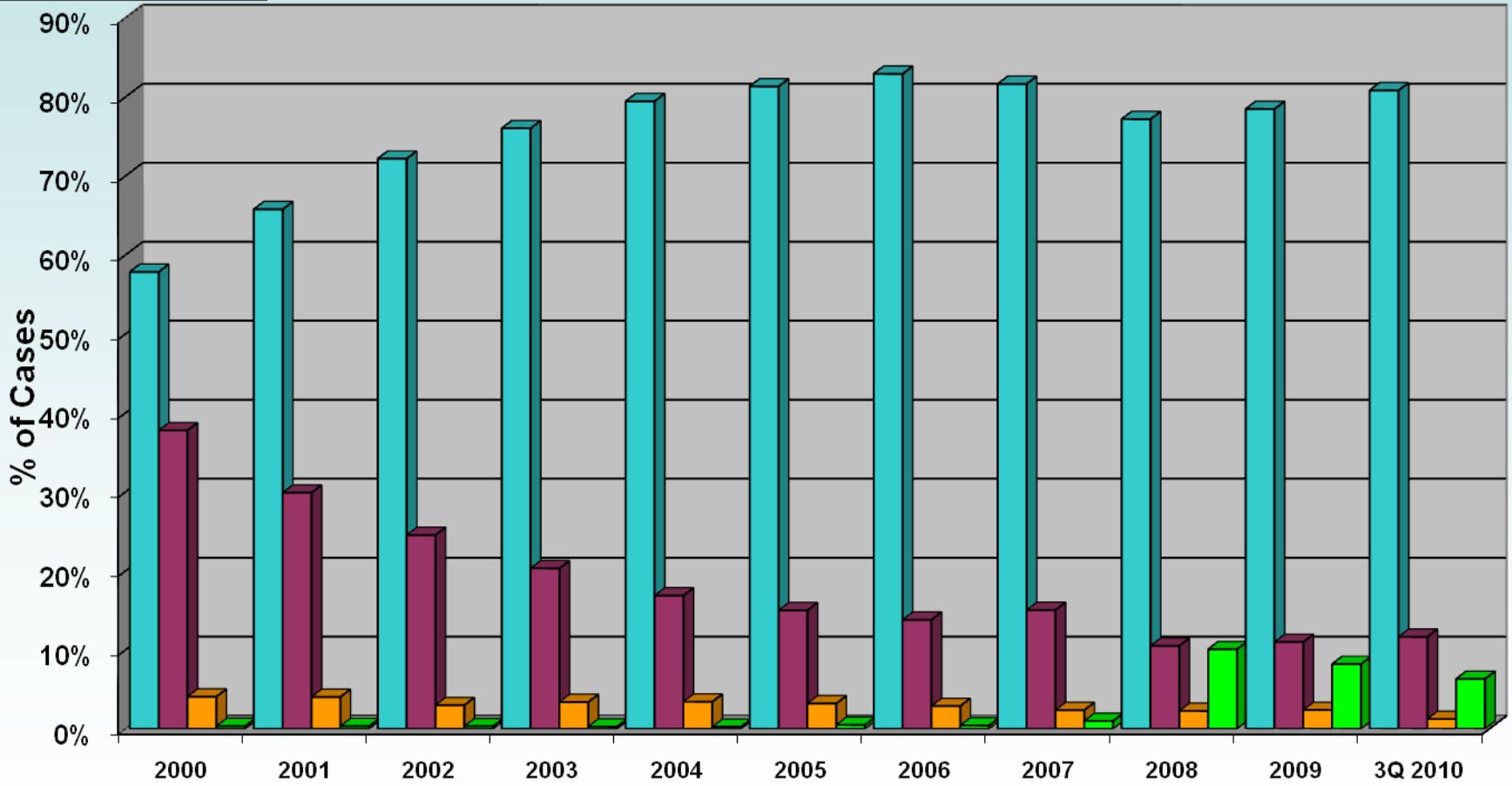
Background

- Traumatic Brain Injury (TBI) is not limited to deployment settings
  - 1.5 million/year in the US
  - Military populations at higher risk for TBI due to age, behaviors and occupation
  - 2010: Over 30,000 cases in DoD population
    - Some estimates as high as 320,000 for Operation Iraqi Freedom/Operation Enduring Freedom
    - Most is mild TBI

Background (Continued)

Background (Continued)

- Post concussion associated with cognitive impairments, slow reaction time and decreased information processing speed

- Risk of chronic cognitive impairment, emotional dysfunction and death following contiguous/repetitive concussions

- Require a means of determining when it is safe for service members to return to duty after a concussion (TBI)

ANAM

- ANAM was developed by the DoD Joint Working Group on Drug Dependent Degradation of Military Performance
- It is a brief, repeatable, automated cognitive measure that provides the opportunity for longitudinal individual assessments
- National Defense Authorization Act for Fiscal Year 2008 mandated pre-deployment neurocognitive testing of service members
- ANAM chosen as the Neurocognitive Assessment Tool (NCAT)
- Since then over 856,000 Service Members have received ANAM baseline testing

ANAM Use

- Defense and Veterans Brain Injury Center (DVBIC) holds baseline data
    - Available on request to assist providers to determine change in neurocognitive status
    - 10,206 requests for individual baseline data received as of March 2011
        - 2,668 in theater
    - Although not as sensitive as pre-post changes in the same individual, population baseline norms can also be used to determine decreased performance on ANAM

NCAT

- ANAM being used in theater to help determine recovery from TBI and return to duty

  – Normative data is established for this instrument

- No comparative data on other NCAT instruments

- DVBIC has approval to begin a study comparing potential NCAT instruments

Findings

1. ANAM has been used in serially testing and precisely measuring cognitive processing in a variety of areas, including neuropsychology, pharmacology, as well as military operational, undersea, and sports medicine. However, ANAM is not intended to diagnose a medical condition and should not be used as a screening or diagnostic tool for a Service member prior to diagnosis.

2. Although sleepiness assessments are part of the current battery, it is not clear how individual results indicating high levels of fatigue are used to modify the remainder of the test procedures. For example, there are no changes to the testing protocol based on a respondent's report of severe fatigue or sleep deprivation.

Findings (Continued)

3. Language problems are typically not affected following mild TBI (mTBI) and moreover cannot be evaluated by a computerized self-administered assessment. Thorough assessment of language ability appears to be beyond the scope of a brief assessment, computerized or otherwise.

4. The majority of mTBI events are not related to deployment; therefore, these findings and recommendations related to neurocognitive assessment are relevant to Service members throughout their term of service.

Findings (Continued)

5. Emerging evidence suggests that ANAM may be an effective pre-deployment tool for establishing baseline neurocognitive performance and providing a comparison standard following individual exposure to events that could have a negative impact on neurocognitive performance. Various independent scientific reports are consistent with this more conservative approach of using Neurocognitive Assessment Tool (NCAT) results in individual Service members.

6. Memory, attention, and effort appear to be embedded in and measured by ANAM.

Findings (Continued)

7. According to DVBIC and the Defense Centers of Excellence for Psychological Health and TBI representatives, using ANAM after an event, either in theater or garrison, is useful in detecting injury and the corresponding neurocognitive deficits when combined with a clinical evaluation, including full neuropsychological evaluation, and compared to that individual's baseline ANAM results.

8. There has been minimal comparisons of brief neuropsychological measures to determine which one is best-suited for NCAT
    a. A substantial amount of normative military population data has been collected through the ANAM tool.
    b. Purported differences between brief measures are often small to modest (for example, one may be modestly better on one domain than another).

Recommendations

Based on recent literature and expert opinion regarding the history, research, policy and implementation of ANAM, the Board submits the following recommendations to the ASD(HA):

1. Universal post-deployment NCAT for all Service members is not recommended, and will not be until further research is performed and understood. Instead, it is recommended that NCAT be used selectively for those that have experienced events (for example, trauma) or show symptoms.

2. NCAT (currently ANAM) is best used as a targeted instrument to increase the data available for individual-level assessment compared to baseline. It should not be used as a stand-alone diagnostic tool or as a sole population measure.

Recommendations (Continued)

3. Decrements in NCAT scores from pre- to post-deployment should not be interpreted in isolation but should be considered together with events, symptoms, and clinical findings.

4. Clinical interpretations of NCAT findings should include other information routinely obtained post-deployment which may themselves affect or be affected by cognitive testing, including depression and posttraumatic stress disorder.

5. NCAT should not be used alone to determine fitness for duty or deployment, should be done cautiously, and must always be coupled with clinical assessments.

Recommendations (Continued)

6. Due to the substantial amount of ANAM normative data for military populations, as well as the understanding that the decision to replace a brief measure (for example, ANAM) with another (for example, ImPACT™), should be based on significant evidence, changing from ANAM is not recommended at this point. Other batteries do not provide a significant advantage over ANAM that would warrant replacement.

7. There does not appear to be an urgent need to add screening measures to the current neurocognitive battery, which can be supplemented during individual clinical assessment with tools available to providers.

8. Analyses should be conducted to determine the importance of fatigue or sleepiness for test results.

Recommendations (Continued)

9. Given the limitations of the brief neurocognitive test, specifically testing complex domains such as executive function and cognition is beyond the scope of the ability of the test; however, such domains appear to be embedded in and measured indirectly by ANAM.

Discussion