The primary operational TBI component of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury

Brainwaves

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Message from

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March is Brain Injury Awareness Month, an annual reminder of the importance of DVBIC's commitment to prevention and treatment of traumatic brain injury (TBI) from the battlefield to the sports field.

Recent collaboration between military medical leaders and senior line commanders has led to proposed guidance that will change the in-theater evaluation and management of concussion. It is fitting that the media has focused this month on such an exciting cultural transition from the system of self-reporting to mandatory incident-based screening for TBI.

Each year, DVBIC's network of regional TBI educators increases the number of events they conduct. Their focus has expanded to include Guard, Reserve and geographically isolated military and veterans populations. Educational resources will be enhanced by new TBI multimedia modules, developed by the US Army in partnership with the other Armed Services, DCoE and DVBIC.

Proper use of ICD-9 codes is crucial to the accurate identification and surveillance of TBIs sustained in-theater and stateside. DVBIC was pleased to facilitate the participation of the DoD military branches with the VA to develop a joint coding proposal which was approved by the CDC this past year. An overview of preferred coding appears in this issue.

New windows of TBI knowledge continue to be opened. The state-of-the science meeting on blast exposure and TBI identified critical research findings and priorities. The upcoming issue of the peer-reviewed journal *NeuroRehabilitation: An Interdisciplinary Journal* will feature 12 research articles from across the DVBIC network. DVBIC was also a sponsor of the International Brain Injury Association World Congress, gathering TBI experts from around the world to review the latest advances.

As we focus on brain injury awareness this month, it remains our privilege and honor to help our dedicated Warriors, Veterans, Families and those who care for them.

"Leaders—especially my colleagues and superiors who are not medical professionals—recognize that TBI is a serious concern; we have dedicated substantial effort and resources to prevent, diagnose, treat and better understand promising treatments for mild, moderate and severe TBI… Receiving renewed and focused attention by the Vice-Chief of Staff of the Army and all leaders are mild TBI or what we all call *concussions*."

LTG Eric B. Schoomaker, MD, PhD
The Surgeon General of the US Army
(From *The Surgeon General's Blog*, US Army Medical Department, 12 Mar 2010)

Multimedia TBI Curriculum

A new multimedia, TBI curriculum will make training on traumatic brain injury (TBI) more accessible, exciting and, in some cases, required for duty.

History

In 2007, the US Army TBI Task Force toured a number of military treatment facilities to identify best practices in TBI assessment and treatment. One finding was that the most successful TBI programs had two key elements: effective case management/care coordination and strong TBI education. The Task Force discovered significant need for robust TBI training across the Military Health System to include TBI awareness materials for military line/leadership and military/line leadership materials, basic TBI clinical information, and focused TBI education specific to a variety of disciplines involved in TBI care.

The Army Medical Command Proponency Office for Rehabilitation and Reintegration (PR&R), using congressionally allocated funds, spearheaded an effort to enhance TBI education across the DoD. They brought together subject matter experts (SMEs) from all Services, DCoE and DVBIC to develop a comprehensive multimedia curriculum. This ongoing process has culminated in an exciting modular program for individuals with a variety of backgrounds to include Service Members (SMs), Families, leaders and providers.

Training Modules

The TBI curriculum is laid out in a tiered system that targets TBI education to specific audiences. The following categories will contain modules that may be viewed independently but, in most cases, are intended

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TBI by the Numbers!

Clinicians can assist in force health protection by accurately coding traumatic brain injuries (TBIs). Data on the number of TBIs sustained by Service Members (SMs), severity of injuries and course of recovery help shape clinical care, direct research and inform policy for protecting SMs.

As described in the *Winter 2008–09 DVBIC Brainwaves*, DVBIC facilitated DoD participation in a tri-service multi-agency panel that met with VA leaders to develop a joint proposal to refine use of the ICD coding system to ensure that all cases of TBI are accurately documented. This joint VA-DoD proposal was officially adopted by the

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State-of-the-Science Blast Injury Report

The Department of Defense (DoD) Blast Injury Research Program Coordinating Office (PCO), with collaboration by DVBIC, hosted the *International State-of-the-Science Meeting on Non-Impact, Blast-Induced Mild Traumatic Brain Injury (mTBI)*, May 12–14, 2009, to critically examine research on the relationship between blast exposure and non-impact blast-induced mTBI and to review proposed injury mechanisms.

The meeting was attended by over 75 experts representing the DoD, Department of Transportation, Department of Veterans Affairs, academia and industry. Representatives from the US, Canada, Japan, The Netherlands and Sweden attended.

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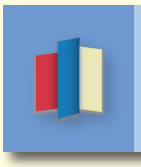

DVBIC Site Profile: Naval Medical Center San Diego and Camp Pendleton Concussion Clinic

DVBIC has two sites in Southern California. The Naval Medical Center San Diego site opened in 1994 as one of DVBIC's first lead sites. The Camp Pendleton Concussion Clinic site was established in 1999 and focuses on care for Marines.

Patients First

The sites' mission is to improve access to care for Service Members who have sustained a traumatic brain injury (TBI). The clinical team provides TBI screening and evaluation, neuropsychological assessment, duty status determination and care coordination.

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A **traumatic brain injury (TBI)** is caused by a blow/jolt to the head or penetrating head injury that disrupts the normal function of the brain. Not all blows/jolts to the head result in a TBI. TBI severity may range from **mild** (a brief change in mental status or consciousness) to **severe** (an extended period of unconsciousness or amnesia after injury). The terms **concussion** and **mild TBI** are interchangeable.

TBI by the Numbers!

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CDC Center for Health Statistics and has become official ICD-9 policy. These ICD-9 coding revisions for TBI were recently published in AHLTA (the military electronic medical documentation system).

Key points of the revised guidance will improve tracking and understanding of TBI symptoms and psychiatric co-morbidities, as follows:

- V-codes will better describe the severity of the TBI and association with GWOT.
  - The appropriate V-15.52_x code will be used at the initial, and all subsequent, encounters. (The 8xx.xx series TBI codes are only to be used when a TBI is first diagnosed.)
  - Upon follow-up, a late effect v-code plus the deployment v-code will be documented.
- New codes for emotional and behavioral symptoms of TBI such as irritability, emotional lability, and impulsiveness (799.xx series) may be used when the patient does not have a psychiatric diagnosis.

For more guidance on TBI coding, please visit the ***TBI Clinical Tools & Resources*** section at **www.DVBIC.org**.

State-of-the-Science Blast Injury Report

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Diverse research topics were presented, ranging from blast physics and mathematical modeling to animal modeling and neurocognitive studies in humans.

Based on data presented at the meeting and other published and unpublished studies, there is evidence from clinical and animal studies that non-impact, blast-induced mild trauma to the brain can occur. Findings were as follows:

- Statistically significant differences in Diffusion Tensor Imaging-Based Fractional Anisotropy between Service Members with documented mTBI associated with blast and Service Members with impact-only mTBI
- Statistically significant differences in event-related potentials between blast and non-blast exposures in human studies
- Preliminary evidence of disturbed phase synchrony following blast exposure
- Differences in functional magnetic resonance imaging (fMRI) between Breacher instructors and students (statistically significant fMRI results, non-statistically significant neurocognitive results)
- Alterations in inflammatory markers in animal studies
- Physiological, histological and/or behavioral differences between blast and non-blast exposures in shock tubes with rodents
- Low-level axonal, neuronal and/or glial damage/reactivity in blast studies (including free field and other) in porcine models

Limitations to these observations:

- **Clinical studies**—small sample size and lack of detailed information regarding exposure conditions at the time of injury
- **Translation of findings from animal studies to humans**—uncertainty of scaling relationships, as well as biological and behavioral differences
- **Laboratory exposures that produce brain injury in animals**—lack of knowledge of real-world exposure conditions

Categories of knowledge gaps in the association between non-impact blast exposure and mTBI were identified by conference attendees as:

- Components and thresholds of blast responsible for insult and injury
- Clinical correlates associated with non-impact blast exposure
- Validated computational and analytic models
- Neuropathological data surrounding blast injury
- Sharing of data across research entities
- Recovery of historical blast injury research data
- Scientifically informed protection, prevention and treatment strategies for blast-related mTBI

To see the full summary of meeting proceedings, please visit the ***Reports*** page at **www.DVBIC.org**.

Papers covering material in the presentations will be published in an upcoming special issue of the peer-reviewed journal, *NeuroImage*.

Special thanks to Mr. Michael J. Leggieri, Jr., Director, DoD Blast Injury Research Program Coordinating Office, US Army Medical Research and Materiel Command, Fort Detrick, MD.

DVBIC Site Profile: Naval Medical Center San Diego and Camp Pendleton Concussion Clinic

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Integration and Collaboration

Both sites work closely with other TBI and combat injury programs at their respective military treatment facilities. Examples are Naval Medical Center San Diego's Comprehensive Combat and Complex Casualty Care program and the Navy-Marine Corps Combat Neurotrauma Registry. Additionally, the sites bring expertise to a formal, multi-disciplinary TBI collaboration that spans Navy Medicine West. This creates a world-class, complete continuum of military TBI care that is easier to navigate.

Education's Battle Rhythm

Education at "teachable moments" in the deployment cycle seeks to improve TBI care on the battlefield and at home. For example, military medical providers recently participated in pre-deployment training on the evaluation of concussion in the deployed setting.

Research Innovations

DVBIC is involved with several clinical research initiatives and collaborations, to include working with the University of California, San Diego to determine the reliability of magnetoencephalography (MEG) in diagnosing patients with mild TBI.

Contact Information

The DVBIC sites at Naval Medical Center San Diego and Camp Pendleton Concussion Clinic serve Southern California, Arizona, Hawaii and Nevada. To learn more, please visit the ***Locations*** page at **www.DVBIC.org**.

DVBIC Brainwaves is a quarterly publication of the Defense and Veterans Brain Injury Center (DVBIC), the primary operational TBI component of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE). Point of Contact: Sheryl C. Chiasson, MBA/HA, BSW, Editor. Email: brainwaves@DVBIC.org

Multimedia TBI Curriculum

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to build on knowledge gained as a provider completes multiple recommended modules for their profession.

100 General Audiences
200 Medical Personnel and Leaders
300 Deploying Medical Personnel
400 Continental US (CONUS) Primary Care Personnel
500 Discipline-Specific Training (for healthcare providers in their own field)
600 Patients and Families

From the beginning of development, PR&R and the SMEs have worked to ensure that the final products would represent all the Services, from the uniforms seen in video clips and imaging to terminology used throughout the training.

Accessing the Training Online

The first four modules of the TBI curriculum are expected to be on MHS Learn in Spring 2010, where registered healthcare providers will be able to complete the training and obtain continuing medical education credits/continuing education units/training certificates according to their profession. Civilian TRICARE healthcare providers will also be able to participate. In addition, the modules will be available on DVD, but without continuing education credit unless offered through a registered class.

In recognition of the prevalence and risk of TBI in the military, all US Army Service Members will be required to take some aspect of the TBI curriculum training. All MEDCOM SMs will be required to take the 201 module. Deploying healthcare personnel will take 201 and 301. 401 will be mandated for primary care providers.

The strongest push right now for the new TBI curriculum is to make it widely available. As LTC Lynne Lowe, Clinical Staff Officer and Army TBI Program Manager in the Proponency Office for Rehabilitation and Reintegration, Health Policy and Services, Office of The Surgeon General states, "Tools must be placed where they can be accessed and utilized by as many people as possible."

Help us improve *DVBIC Brainwaves!*

How is it useful? What could be better?
Please email us at **brainwaves@DVBIC.org**.

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