

The 4th Annual Trauma Spectrum Conference

Bridging the Gap Between Research and Clinical
Practice of Psychological Health and Traumatic Brain
Injury: Prevention, Diagnosis, Treatment and Recovery
for the Iraq and Afghanistan Cohort

Conference Proceedings

Dec. 8-9, 2011

Natcher Auditorium, Bethesda, MD



Table of Contents

EXECUTIVE SUMMARY 6

PLENARY AND WORKING LUNCH PRESENTATIONS 11

Traumatic Brain Injury: Research and Clinical Care <i>Ramon Diaz-Arrastia, M.D., Ph.D.</i>	11
Integrative Telehealth/Mobile Technologies <i>Gregory Gahm, Ph.D.</i>	14
Evidence-based Practice and Comparative Effectiveness <i>Elise Berliner, Ph.D.</i>	17
Sleep Disorders <i>Anthony Panettiere, M.D.</i>	19
Assessing Risk & Protective Factors for Suicide in US Army <i>Michael Schoenbaum, Ph.D.</i>	21
Recent Advances in the Psychological Treatment of PTSD <i>Terry Keane, Ph.D.</i>	24
Major Depressive Disorders <i>Col. (Ret.) Elspeth Ritchie, M.D., Ph.D.</i>	26
Real World Implementation & Training for Evidence-Based Psychotherapies: Dissemination and Implementation of Evidence-Based Psychotherapy in VAHCS <i>Brad Karlin, Ph.D.</i>	28
Real World Implementation and Training for Evidence-Based Psychotherapies	
Training Providers in Evidence-Based Therapies – Lessons from the Field <i>David S. Riggs, Ph.D.</i>	30

THURSDAY AFTERNOON BREAKOUT SESSIONS 32

Substance Misuse and TBI: Opportunities for Strategic Interventions <i>John D. Corrigan, Ph.D.</i>	32
Cognitive Rehabilitation <i>Heather Belanger, Ph.D., ABPP-CN</i>	35
Implementing New Models of Mental Health Care for Veterans: Lessons from the Field <i>David Atkins, M.D., M.P.H.</i>	37
Implementing Population-based Outreach Services to Re-Engage Veterans In Care <i>Amy M. Kilbourne, Ph.D., M.P.H.</i>	38
No Easy Handoff: From Research to Practice And Back Again <i>Mona Ritchie, M.S.W.</i>	39
Traumatic Brain Injury Care in the Armed Forces <i>Katherine Helmick, M.S., CNRN, CRNP</i>	40
VA Women’s Health Research <i>Kristen M. Mattocks, Ph.D.</i>	42
Patterns of VA and Non-VA Care for Gender-Specific Conditions among Women Veterans Returning from Iraq and Afghanistan <i>Anne G. Sadler, R.N., Ph.D.</i>	44
Post-Deployment Co-Occurring Disorders: Scope Of The Problem & Treatment Approaches <i>Jay M. Uomoto, Ph.D., and Miguel Roberts, Ph.D.</i>	46

FRIDAY MORNING BREAKOUT SESSIONS 48

Tobacco Cessation for PTSD – Rationale and Strategies for Implementation <i>Miles McFall, Ph.D.</i>	48
Translating Research Findings into Clinical Practice: Projects Underway, Lessons Learned, Future Plans <i>Andrew Saxon, M.D.</i>	49

Table of Contents

Cognitive Rehabilitation: Review of the Research & Clinical Applications <i>Therese O’Neil-Pirozzi, Sc.D.</i>	51
CogSMART Compensatory Cognitive Training <i>Elizabeth Twamley, Ph.D.</i>	52
Co-Occurring Substance Use Disorder, Post-traumatic Stress Disorder, and Mild Traumatic Brain Injury: Clinical Considerations <i>Lisa Najavits, Ph.D.</i>	53
Substance Abuse in the Military: Highlights of NIDA Activities <i>James M. Bjork, Ph.D.</i>	55
Mobile Apps and Tele-mental Health Treatment/Integration of Technology in Psychological Health and Traumatic Brain Injury Care <i>Karl O. Moe, Ph.D., Elspeth Fast, M.S.W., L.I.C.S.W., Leslie Morland, Psy.D., Bridget Ruiz, M.Ed.</i>	56
Implementation and Wellness Strategies: Using the Total Force Fitness Framework in Case Conceptualization and Treatment Planning <i>Mark Bates, B.A., Ph.D., and Colanda Cato, Ph.D.</i>	58
PTSD Therapies with Ongoing Research Updates <i>Ronald Hoover, Ph.D.</i>	60
Shared Decision Making: Improving Care By Incorporating Patient Preferences Into Treatment Decisions <i>Nananda Col, M.D., M.P.P., M.P.H., FACP</i>	62
Acute Pain Management Task Force Downrange Pain Control <i>Col. Chester Buckenmaier, USA, M.D.</i>	63
Battlefield to Bedside and Back Home: Research along the Continuum of Pain Care in the Military and Veterans Health Systems <i>Rollin M. Gallagher, M.D., M.P.H.</i>	65
Army Pain Management Initiative: Where We Are <i>Kevin Galloway, Col., USA, B.S.N., M.H.A.</i>	67

FRIDAY AFTERNOON BREAKOUT SESSIONS

68

Disseminating Cognitive Processing Therapy in VA: The Advantages and Challenges of a National Training Initiative <i>Kate Chard, Ph.D.</i>	68
Towards Continuous Implementation of Best Practices in PTSD Care <i>Josef I. Ruzek, Ph.D.</i>	69
Implementing Telephone-Based Care Models For Depression and PTSD in Primary Care <i>Bradford Felker, M.D.</i>	72
Speech-Language Pathology Guidance: Cognitive-Communication Rehabilitation for Concussion/mTBI in the Military Population <i>Micaela Cornis-Pop, Ph.D., and and Carole Roth, Ph.D.</i>	74
Mapping the Evidence: The AHRQ Evidence-based Practice Centers <i>Stephanie Chang, M.D., M.P.H.</i>	76
Traumatic Brain Injury: A Trauma Surgeon’s Disease <i>Oscar Guillamondegui, M.D., M.P.H., F.A.C.S</i>	77
Access to Recovery: Meeting the Needs of Veterans and Military Service Members <i>Linda K. Fulton, Ph.D.</i>	78
Getting Further Faster by Sharing TBI Research <i>Ramona Hicks, Ph.D.</i>	81
Real World experience with Implementing the TBI Common Data Elements <i>David O. Okonkwo, M.D., Ph.D.</i>	82
New Outcomes Measurement Systems for Biomechanics and Rehabilitation Research <i>David S. Tulsky, Ph.D.</i>	83

Table of Contents

An Automatic MEG Low-Frequency Source Imaging Approach for Detecting Injuries in Mild and Moderate TBI Patients with Blast and non-Blast Causes <i>Mingxiong Huang, Ph.D.</i>	85
Intracranial Pathology on MRI <i>Larry Latour, Ph.D.</i>	86
Neuroimaging of TBI <i>Gerard Riedy, Ph.D., M.D.</i>	86
Use of Psychological Health Clinical Support Tools (CSTs) to Improve Psychological Health Care: Existing Psychological Health CSTs for Depression, Substance Use Disorder and Posttraumatic Stress Disorder <i>Miguel Roberts, Ph.D.</i>	87
Acute Psychological Care in Theater: Operation Enduring Freedom Combat Stress Control <i>Col. Christopher Robinson, M.P.H., Ph.D.</i>	88
PTSD Prevention: Lost in Translation from Bench to Bedside <i>Meena Vythilingam, M.D., CDR, USPHS</i>	91
POSTER SESSION ABSTRACTS	94
SUMMARY AND TAKE HOME POINTS	106
ADDENDUM	108
Trauma Spectrum Conference CD Toolkit	108
Conference Schedule and List of Presentations	115
Sponsoring Organizations	118
Conference Audio and Video Content	120
Disclaimers	121
Acknowledgements	122

4th Annual Trauma Spectrum Conference

Bridging the Gap Between Research and Clinical Practice of Psychological Health and Traumatic Brain Injury: Prevention, Diagnosis, Treatment and Recovery for the Iraq and Afghanistan Cohort

Dec. 8-9, 2011
Natcher Conference Center
National Institutes of Health
Bethesda, MD

This year's Trauma Spectrum Conference – a collaborative effort of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE), the National Institutes of Health (NIH) and the Department of Veterans Affairs (VA) – highlighted the latest research, available resources and best practices for the identification and treatment of posttraumatic stress disorder (PTSD), traumatic brain injury (TBI) and conditions related to those disorders. Over forty-eight experts shared their knowledge and experience not only in the areas of PTSD and TBI research and treatment, but also in the areas of cognitive rehabilitation, sleep disorders, insomnia, pain management, depression, implementation science, comparative effectiveness research, co-occurring disorders and integrative telehealth/mobile technologies.

Executive Summary

The objectives of this conference were to provide a forum for (1) federal partners to promote research and evidence-based practices through enhanced coordination and collaboration across agencies, (2) researchers to update participants on latest research findings in PTSD, TBI and related disorders, (3) identifying areas for future research and (4) learning about evidence-based practice implementation strategies. Over five hundred physicians, psychologists, nurses, social workers, physical therapists, occupational therapists, health care administrators and policy experts from the military, federal and civilian sectors attended the conference held at the Natcher Conference Center on the NIH campus in Bethesda, MD.

This year's focus was on "bridging the gap" between research and clinical practice with regard to the prevention, diagnosis, treatment and recovery for the Iraq and Afghanistan cohorts. The conference was designed to provide attendees with knowledge on some of the more recent interventions and care implementation strategies informed by science. Numerous evidence-based practices and training are ready for implementation in clinical settings, and invited presenters discussed these developments and ways they could be implemented. Presenters also discussed how researchers are incorporating the ideas and feedback of frontline clinicians to synchronize research agendas and efforts with clinical practice needs.

During the conference introduction, DCoE Director Capt. Paul Hammer, expressed optimism about the way in which bright and creative minds are finding effective ways to treat these difficult disorders. The challenge is how to integrate these innovations into standard practice as quickly as possible. Capt. Hammer highlighted three key points to keep in mind during the conference and when treating wounded warriors:

1. Translation – finding ways to bridge the gap between brilliant research efforts and clinical realities in a timely manner. There is a need to break down information stove-piping that can occur in federal research settings, which inhibits treatment development;
2. Systemic Implementation – finding ways to implement innovative practices into overworked health care systems that can unintentionally resist changes that these new treatments require; and
3. Patient Focus – Nothing should come before treating those who fought bravely and valiantly – not the system, the agency, or other factors that would make things more convenient for anything or anyone besides our patients.

Representing the efforts of NIH, Dr. Janine Austin Clayton, acting director of the Office of Research on Women's Health, discussed the high priority NIH placed on collaboration to treat conditions that service members face. Twelve of the 27 NIH institutes and centers are actively collaborating to develop effective treatments, and there are 72 studies actively funded by NIH related to the health effects of war exposure. In addition, the National Library of Medicine on the NIH campus created a women's health resources information portal for research findings and resources for service members, veterans and their families that combines data from NIH, VA and the Defense Department (see whr.nlm.nih.gov). This effort is emblematic of the collaborative spirit promoted at this conference.

Finally, representing the VA (vice Dr. Joel Kupersmith) was Linda Lipson, the scientific program manager for the Health Services Research and Development Service (HSR&D). Ms. Lipson articulated VA's strong commitment to collaborate with NIH and the Defense Department. The VA has an impressive record of implementing evidence-based treatments, and conducting large multi-site clinical trials, and the VA has greatly bolstered its research portfolio to address the health care needs of our most recent cohort of veterans, including the growing number of women veterans.

Executive Summary

The conference consisted of plenary talks given throughout the two-day conference followed by breakout sessions designed to cover the topic areas in more detail and allow attendees to ask questions and strategize with the presenters. This year's plenary talks included a review of the latest research/clinical outcome findings for TBI, PTSD, major depressive disorder and sleep disorders, as well as presentations on integrative telehealth/mobile technologies, the process of developing evidence-based practices and an update on the Army STARRS (Army Study to Assess Risk and Resilience in Servicemembers) suicide research program. The breakout session topics included advances in neuro-imaging, data sharing in TBI research (TBI Common Data Elements initiative and the NIH Toolbox), comorbid substance use disorders with TBI and PTSD, women's health in active duty and veteran populations, cognitive rehabilitation for TBI, co-occurring disorders and implementation science.

As the conference presentations unfolded, various themes emerged particularly related to future research efforts and clinical interventions as outlined as follows:

The use of technology will be a major factor in the development and augmentation of treatments and of self-care techniques for service members and veterans. The innovative use of communications and computer-based technology was a thread that weaved its way through virtually every presentation at this year's Trauma Spectrum Conference. Technology has always played a major role in the evolution of health care. In the early 20th Century, the leading causes of death were infectious in nature (e.g., pneumonia/influenza, tuberculosis, gastritis, etc.)—diseases that modern medicine has largely conquered through advances in microbiology and public health initiatives. However, the nature of disease has changed. Currently, the leading causes of death are chronic conditions such as heart disease, cancer and stroke. Unlike infectious disease, chronic disease has a non-infectious origin and is heavily influenced by personal behavior such as exercise, diet, smoking and alcohol/drug consumption.

By addressing the conditions that our wounded warriors face in a way that traditional medical practice cannot, the technological innovations presented at this year's Trauma Spectrum Conference have the potential to radically improve care by addressing behavior in real time outside of medical settings. During the conference, numerous presenters outlined how they used technology that can also be used to improve care in health care settings developed for non-medical fields (e.g., communications, logistics, industry, etc.) to make devices and processes that will monitor and influence behavior in real time and vastly improve the treatment we provide. These innovations are “always on,” and can constantly monitor behavior and physical symptoms as well as provide access to care in a way that is impossible for our existing health care system. Dr. Gahm, Director of the National Center for Telehealth and Technology (T2), discussed numerous smartphone “apps” (applications) that can be used as stand-alone aids for service members or as adjuncts to therapy. For example, he outlined the “PTSD Coach” smartphone app that lets the user self-assess PTSD symptoms (instantly and over time), manage symptoms through suggested coping skills and techniques and provide assistance in finding support. Dr. Gahm also discussed the use of telehealth or audio- and video-based therapy performed remotely (e.g., Skype), an innovation to help treat service members who otherwise would not receive care. Presenters showed how therapeutic interventions can be delivered over the internet as a form of self-study without the use of a licensed provider, as shown by Dr. Keane in his plenary talk on advances in the treatment of PTSD. Technology can also assist providers. Dr. Ruzek discussed the use of web-based resources to train therapists in Prolonged Exposure, and Drs. Uomoto and Roberts presented on the Co-occurring Conditions Toolkit accessible on a smartphone that will assist providers in treating service members and veterans with comorbid conditions. Technology will also help researchers develop cloud-based data-collection methods that will allow them to aggregate data and develop more data-driven evidence-based practices.

Executive Summary

Recent advances in imaging technology combined with strong initiatives for data sharing and standardization will result in significant advances in the treatment of TBI, PTSD and related disorders. Several researchers expressed optimism that recent advances in imaging technology will assist them in developing effective treatments in the future. Thursday's keynote speaker, Dr. Diaz-Arrastia, stated that the inability to develop effective neuro-protective drug therapies for TBI in humans after the successes found in animal models may have been due to the inability of older imaging technology to identify the heterogeneity in the structural and neurobiological differences among those with TBI, and that may respond differently to the various medications. However, he also reported new developments in MRI analysis that will have a greater ability to detect the biomarkers of TBI that may respond differently to the various drug therapies. There are five forms of MRI analysis that show promise and are currently being researched, and two of them are readily available in most military and civilian imaging centers. In addition to the improvements in MRI detection, there are also several initiatives to standardize the data collected on TBI patients to allow comparison of results across numerous clinical and research settings. Past efforts to combine data were plagued by widely different imaging techniques and patient self-report data formats that resulted in insufficient power to detect markers and processes. However, initiatives such as the TBI Common Data Elements project and the TRACK-TBI network are addressing those issues and will greatly improve researchers' ability to develop more accurate models of pathology and innovative treatments.

There is significant co-occurrence of disorders brought on by war exposure, and research suggests an integrated treatment model addressing the service member in a coordinated manner may be more effective. Numerous presenters asserted that it is much more common for service members to present with co-occurring diagnoses than with a single diagnosis of TBI, PTSD, chronic pain, insomnia or substance use disorder. Over half of the presentations dealt with the research or treatment of a co-occurring disorder or factors that affect the service member's well-being. In addition, findings presented at this year's conference suggest that a treatment model that integrates all aspects of the service member or veteran's care is more effective than one that addresses each disorder in separate "silos" of treatment. For example, Dr. Corrigan pointed out in his presentation on the simultaneous treatment of substance use disorders in patients with TBI that it is common for a substance use counselor to incorrectly label a person as non-compliant when the true cause is merely frustration with deficits related to TBI. Dr. Najavatis presented on the "Seeking Safety" treatment model that addresses substance use disorders in patients with PTSD in a way that respects the tendencies of both disorders. Dr. Bates, DCoE's Resilience and Prevention director, discussed the Total Force Fitness (TFF) initiative, an integrative approach to overall service member functioning that incorporates eight separate domains of individual fitness and focuses on strengths and resiliency as much as disease and vulnerability. Many presenters noted the high level of co-occurrence and overlap of symptoms among these disorders, and repeatedly expressed the opinion that treating these disorders is most effective when done in an integrated manner.

The "Technology Transfer" of innovative and effective treatments from "bench" to "bedside" remains a challenge, but researchers and health care providers are finding ways to implement change. Presenters consistently reported that transferring effective, research-based treatments into clinical practice is a considerable challenge, but also reported that they are finding ways to bring needed change to improve treatment for service members and veterans. A consistent finding in the medical research literature is that technology transfer is a slow, difficult process with an inconsistent record of success, and this phenomenon is true across a wide array of other areas such as communications,

Executive Summary

marketing, management, and public health. As Capt. Hammer pointed out in his introductory comments, translating research-based treatments into standard clinical care takes an average of seventeen years, and that this time lag negatively affects the ability to treat service members impacted by war exposure. Nonetheless, researchers and policy advocates are creating more effective ways to disseminate research findings and make improvements in procedures. Realizing that traditional methods of dissemination such as publishing in scientific journals and presenting at conferences is insufficient, they are developing strategies to streamline dissemination and implementation of these new treatments, including obtaining leadership buy-in, implementing systems changes to make the innovations possible (e.g., AHLTA note compatibility, incorporating the innovation into productivity requirements, etc.), and providing training and ongoing supervision and mentorship for the providers. Other key strategies involve taking into consideration the setting in which the intervention will take place (e.g., medical center versus a Role 3 medical unit) and allowing the end user to be involved in the implementation planning. A focus on addressing the difficulties in technology transfer is essential to take improved evidence-based treatments to military and veteran health care facilities and practice.

For these evidence-based innovations to be effective, the bridge between “bench” and “bedside” must be collaborative and adaptable. Numerous presenters opined that feedback from end user health care providers often facilitates clarity in the conceptual understanding of a disorder or how a treatment is delivered. Dr. David Riggs, director of the Center for Deployment Psychology, provided an example of this in the delivery of prolonged exposure (PE) therapy in a combat environment to treat PTSD. Due to operational constraints, providers in the field made numerous modifications to these treatments, and instead of hindering treatment, they are advancing it through innovations like video teleconferencing (e.g., Skype) and daily exposure therapy sessions versus the research-based treatment model that employs weekly sessions in a controlled therapeutic setting. Another example from the field of neuro-imaging was provided by Cmdr. Vythilingam where she described how patients who successfully responded to behavioral treatment for PTSD provided neuro-imaging researchers an opportunity to identify areas of the brain impacted by PTSD through pre- and post-treatment imaging. Across the board, presenters all stated that a top-down, one-way model of researcher to clinician dissemination is ineffective, and a collaborative relationship between researcher and clinician is optimal for the development of effective treatments.

Plenary and Working Lunch Presentations

Thursday Morning Keynote Address

Traumatic Brain Injury: Research and Clinical Care

Ramon Diaz-Arrastia, M.D., Ph.D., Center for Neuroscience and Regenerative Medicine, Department of Neurology, Uniformed Services University of the Health Sciences

- Dr. Diaz-Arrastia gave a brief outline of the history of TBI in military medicine, its effects on society, its prevalence in the recent conflicts and recent advancements in the care for service members and veterans.
- Dr. Diaz-Arrastia discussed recent attempts to develop neuro-protective drug therapies for TBI. Recent advances in magnetic resonance imaging were presented, along with suggestions as to how these innovations may lead to advances in treatment and a reduction in brain injury-related disability.

TBI is among the earliest described injuries in human history, and researchers have proposed that the ability to overcome the consequences of TBI could very well have been a major selective factor in early human evolution. Although modern society has reduced rates in comparison to earlier times, TBI continues to be prevalent with 1.7 million with emergency room visits and 52,000 fatalities annually in the United States, and an estimated 2 percent of the U.S. population living with some form of TBI-related disability. TBI is the single most common cause of death and permanent disability in people under the age of 34, and total the annual health care costs are estimated to be \$56.3 billion.

TBI is not a new phenomenon for military medicine. Despite the changing advances in medicine, Dr. Diaz-Arrastia pointed out that helping service members deal with the aftermath of trauma is a perennial task for military medicine. Researchers are getting a more complete sense of the impact of TBI on service members. Dr. Diaz-Arrastia noted that Hoge et al “found that approximately five percent of service members had loss of consciousness during OEF/OIF, around ten to fifteen percent had some type of altered mental status and that multiple head injuries were very common.” Research has also revealed that PTSD and TBI share many of the same symptoms (e.g., fatigue, sleep disturbances, memory problems, balance difficulties, concentration problems, and irritability) and that they are frequently co-occurring conditions.

The increased focus on TBI recently has greatly improved the care of service members and veterans. Researchers now have a greater awareness of the symptoms and impact of TBI that earlier experts were not able to detect. Physicians in prior conflicts commonly referred service members with TBI-related symptoms to psychiatry. Without the ability to detect, identify or treat the effects of a TBI, patients were often diagnosed with a character disorder and provided little to no rehabilitative treatment. Patients are getting more appropriate and effective care under current treatment models.

Dr. Diaz-Arrastia mentioned several drug therapies developed in animal models that have identified and augmented the molecular and genetic mechanisms that the brain employs to respond to a mechanical insult. Unfortunately, those same drugs that are effective in animals have proved ineffective when tested in humans – a finding that highlights the challenges of translational research. This dilemma has drawn great attention and researchers have identified areas that need greater focus and specificity. For one, researchers now understand that prior studies did not have good clinical measures to identify the heterogeneity of TBI in humans. Consequently, they were not able to identify the different phenotypes of injury that may have responded differentially to the various neuro-protective drugs found effective in animals. Dr. Diaz-Arrastia pointed out that researchers are now using a construct borrowed from psychiatric genetics called the endophenotype, defined as one of several measurable, continuous variables that contribute – somewhat differently in each individual – to the expression of the phenotype (i.e., the disease). Using the example

Plenary and Working Lunch Presentations

of coronary artery disease (CAD), the endophenotypes of hypertension, hyperlipidemia and vascular inflammation lead to this disease, and though they may contribute differently in different people, doctors have reduced mortality by treating each endophenotype aggressively and prophylactically. Transferring this model to TBI, researchers postulate that it will be necessary to identify the endophenotypes that contribute to a TBI and treat each of them as they do in CAD. Dr. Diaz-Arrastia mentioned some initial hypothesized TBI endophenotypes under examination, including intracranial hemorrhage, ischemia and diffuse axonal injury. Many others may exist.

Dr. Diaz-Arrastia proceeded to discuss ground-breaking research underway to identify endophenotypes of TBI using MRI neuro-imaging. A consensus panel at the National Institute of Neurological Disorders and Stroke (NINDS) determined that this technology was the area of study most likely to provide the additional detail necessary for an improved classification and treatment of TBI. Dr. Diaz-Arrastia mentioned five forms of MRI analysis that he thinks will be useful in identifying biomarkers of TBI. Two of these are readily available in current clinical practice: (1) fluid attenuated inversion recovery (FLAIR) and (2) diffusion weighted imaging (DWI). Dr. Diaz-Arrastia provided an example of an individual in a car accident who had a normal CT scan, but after continued impairment, doctors requested a FLAIR MRI and found an injury in the splenium of his corpus callosum. Importantly, the size of a lesion detected by a post-acute FLAIR MRI is significantly correlated with the level of impact on function (as measured by cerebral atrophy). In addition, he showed a set of slides comparing CT, MRI FLAIR and MRI DWI on different classes of brain abnormalities, showing how FLAIR and DWI MRI scans can differentiate injuries that primarily affect the grey matter and neuronal cell bodies from those that are mostly axonal – a differentiation that may help researchers develop specific treatments (see Figure 1).

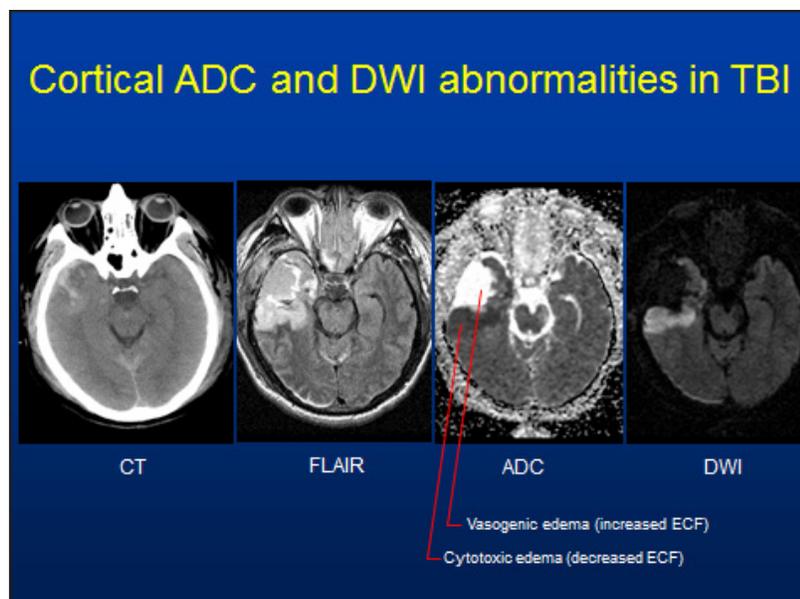


Figure 1. Slide comparing CT brain scan to scans using newer MR technology on the same patient (ADC – apparent diffusion coefficient – a form of DWI imaging).

Unfortunately, information from FLAIR and DWI MRI can only provide useful information if they are taken shortly after the injury occurred (approximately seven days).

Plenary and Working Lunch Presentations

Dr. Diaz-Arrastia then discussed more experimental techniques under study that are not currently available but show very strong promise for the near future. These include three forms of MRI analysis that, while currently used only in research settings, will likely have clinical application in the next few years. They are (1) diffusion tensor imaging (DTI), (2) quantitative volumetric assessments and (3) resting state functional MRI. DTI measures not only the diffusion of water in the brain, but also the directionality of the diffusion, making it particularly effective for detecting damage to the white matter. Researchers are working to develop the best way to interpret the findings of this scanning method, and should soon have an empirically based model. Another experimental technique under study is tract based spatial statistics that show abnormalities in individuals with a seemingly mild TBI, but who have persistent symptoms months later. Dr. Diaz-Arrastia opined that many in the field believe it is better than DTI for this reason.

Lastly, Dr. Diaz-Arrastia mentioned the FreeSurfer assessment of regional brain volumes, a technique that has revolutionized the field of neurodegenerative disease research and may also similarly impact the development of TBI treatments. FreeSurfer is an automated MRI brain imaging software package that reconstructs topologically and geometrically accurate models of grey/white and pial surfaces of the brain. FreeSurfer allows researchers to more clearly identify the differential impact of TBI. For example, Dr. Diaz-Arrastia showed a case of an individual with a four percent overall brain atrophy that FreeSurfer determined varied widely in different regions (10-15 percent atrophy for the amygdala, thalamus and hippocampus for the subcortical structures and similar rates in the posterior cingulate, superior parietal cortex and superior frontal cortex in the cortical region). These findings inspired studies by Dr. Diaz-Arrastia's group to look at the default mode network in brain injury to see if it is the factor that disrupts attention and memory in TBI patients. They have identified disruptions in synchrony between the left and right hippocampal and dorsolateral prefrontal cortex regions of patients with TBI-related deficits. Interestingly, the pattern of atrophy seen in these cases of TBI is very similar to the patterns seen in Alzheimer's disease and age-related decline. Within a short time, Dr. Diaz-Arrastia believes that practitioners will have greater ability to differentiate between irreversible brain injury and injury that will respond to treatments under development (see Figure 2).

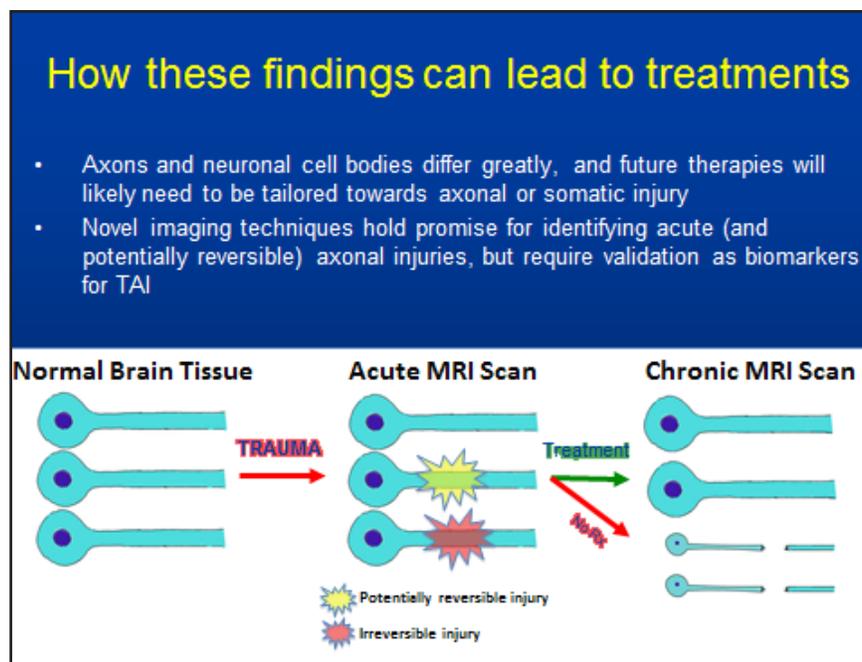


Figure 2. Outline of how advanced imaging could be used to target effective treatments.

Plenary and Working Lunch Presentations

Dr. Diaz-Arrastia discussed the comparison of TBI across civilian and military settings. Though the biomechanical details may differ, and military populations may be more at risk to more severe and repeated injuries, he stated that effective therapies will likely apply across the different populations. He mentioned the relatively new Center for Neuroscience and Regenerative Medicine (CNRM) based at the Uniformed Services University Health Center, where there are 23 protocols and seven treatment trials underway. Examples of these include aerobic exercise, transcranial direct-current stimulation, computerized cognitive behavioral therapy, sildenafil for treatment of diffuse vascular injury, growth hormone supplementation during rehab and erythropoietin for mild TBI. Dr. Diaz-Arrastia also mentioned efforts to create the National Capital Area TBI Research Consortium, an endeavor that would assist researchers and practitioners in coordinating clinical and pre-clinical efforts.

In conclusion, Dr. Diaz-Arrastia identified a number of factors that will greatly affect the future of TBI research and treatment. First, he stated that it is clear that this is no longer a “silent” epidemic, given the awareness people have of the problem. It is important that we take advantage of this period of increased awareness to move the science forward. Second, there is technology currently available that is capable of yielding major advances in TBI treatment. It will take creativity, working “outside of silos,” and swiftness of foot to develop meaningful and effective treatment modalities from these technological advances.

Thursday Morning Plenary Talk

Integrative Telehealth/Mobile Technologies

Gregory Gahm, Ph.D., Director, National Center for Telehealth and Technology (T2)

- This presentation outlined the overall prospects and challenges to implementing technology-based innovations into behavioral health care. Recent advances in technology and growing familiarity with those advances have created a unique opportunity to develop and implement innovative treatments.
- Dr. Gahm outlined some of the projects that the National Center for Telehealth and Technology (T2) is working on to improve care for service members and veterans, including web-based resources, mobile device applications, virtual reality and avatar-based techniques, clinical video telehealth treatment involving remotely located transportable and mobile units and other promising technologies early in development.

Dr. Gregory Gahm, Director of the National Center for Telehealth and Technology (T2), began his plenary talk by stating the large role technology is playing not only in society in general, but also in the development of new and innovative treatments for the behavioral aspects of conditions that are brought on by war exposure. T2 is at the forefront of creating and implementing technology solutions to improve the quality and effectiveness of care for our military and veteran populations across the full continuum of care, from prevention to reintegration. In order to accomplish this ambitious task, T2 has integrated the latest advances in both behavioral science and technology to help patients change their behavior and deliver timely and accurate information to them and their providers. At the same time, T2 is aware of the challenges of integrating new technology into standard care. Dr. Gahm stated that T2 is working to address the resistance that their technology can arouse in providers and patients, and they are well aware that pragmatic and creative uses of technology should facilitate – not complicate – delivery of care. T2 focuses its work on developing the health, resilience and well-being of service members and veterans rather than a singular focus on pathology. They are aware that past interventions were unintentionally harmful by their over-focus on addressing problems and not building strengths. By creating tools that can be used throughout the entire continuum of care - rather than just in the acute treatment phase - T2 is helping to address service

Plenary and Working Lunch Presentations

members' needs before, during and after deployment with technologies that engender resilience and take into consideration the patient's social context.

Dr. Gahm then outlined some of the products that T2 has recently developed. He mentioned a web-based resource, afterdeployment.org, which is a joint Defense Department/VA effort and has emerged as an important resource for the broad military community. It provides self-care resources, provider support tools and links to organizations and resources that provide clinical services. Another T2 website is targeted toward children of service members: militarykidsconnect.org. This website was developed to help children adjust to having parents on deployment. This website offers children ages 6-17 the opportunity to learn about deployment and how it may affect them and their family. It also provides a way for them to connect with other military children.

T2 is making inroads into another cutting-edge platform for technology innovation, software "apps" (applications) for mobile devices such as smartphones and tablets. Experts in technology and behavioral health research indicate that mobile devices are the best way to maintain contact with a service member anywhere in the world. T2 has developed several smartphone apps that support and extend behavioral care assessment, monitoring and management, and provide valuable health information to service members, veterans, family members and providers. They are virtually "always on" for the service member or veteran, as compared to most health care communication and monitoring that only occurs during normal business hours. This is seen as an attribute that will revolutionize health care delivery.

Dr. Gahm discussed several of those applications. The PTSD Coach app, which can be used by both the iPhone and Android platforms, is a collaborative effort with the VA that provides a host of functions to help patients and their loved ones understand PTSD, and includes functions for (1) the self-assessment of PTSD symptoms, (2) individualized feedback about how to deal with those symptoms and (3) a means for tracking the incidence and severity of symptoms over time. Users can immediately access support from national hotlines, providers and friends or family whose contact information is stored in the app, and it can also include education modules on key topics related to trauma, PTSD and treatments. Another T2 development is the Breathe2Relax app, which teaches about the effects of stress and guides the user in diaphragmatic breathing to promote relaxation. The T2 MoodTracker app tracks six major categories of affect across nine measures, providing users with a valuable self-assessment. MoodTracker appears to be popular with service members and veterans, with over 31,000 copies downloaded by users since September 2010 and more than 185,000 sessions logged by those users. Based on a collaborative effort with DCoE, T2 developed the Mild Traumatic Brain Injury Pocket Guide mobile app that takes the written guide created by DCoE and allows providers to access that information in an efficient and time-saving manner. This application provides current information on assessing, treating and managing common symptoms of mild TBI patients and has a wide range of diagnostic, treatment and information resources.

Another area of focus for T2 is "telehealth," defined as the use of two-way video-based teleconferencing to provide health care and behavioral health services. Telehealth has tremendous potential to allow doctors or clinicians to provide effective treatment to patients in distant or remote locations. Initial studies on the efficacy of telehealth have been positive. In an initial "proof of concept" pilot study, T2 deployed a Transportable Telehealth Unit (housed within a large cargo holder) to American Samoa to enable patients there to get treatment from providers 2,500 miles away at Tripler Army Medical Center in Hawaii. Based on positive findings from that effort, T2 is rapidly developing and piloting a whole range of deployable telehealth configurations to meet specific needs and environmental requirements for the multitude of Defense Department and VA settings. These telehealth platforms all contain the required space and audio/video equipment for patients to engage in treatment, and onboard generators and satellite links for telehealth

Plenary and Working Lunch Presentations

units deployed in remote locations. These flexible designs will allow the military health care system to better support service members at forward installations and remote locations and more easily meet demand surges. T2 is also developing other telehealth-related concepts, including “telehealth centers” that will allow patients to avoid the stigma associated with visiting hospitals or clinics for treatment. A study of handheld video telehealth units is currently underway to examine their safety and efficacy for in-home tele-behavioral health treatment. Dr. Gahm mentioned the inherent security and privacy risks in electronic communication methods, but stated that these issues are being addressed.

Another area of innovation at T2 is the development of virtual/augmented reality tools to address disorders that result from war exposure. Researchers are hopeful that this technology will help improve cognitive performance, increase mental strength, and foster resilience and the ability to handle stress and trauma. Currently, there are clinical trials underway in Washington state and at Fort Bragg, NC, comparing virtual reality exposure therapy with a traditional approach to prolonged exposure therapy, which is a gold standard of behavioral treatments for PTSD. Initial results suggest that the use of virtual reality technology may reduce the number of sessions required to reduce PTSD symptoms and improve patient functioning. T2 is also developing various computer-based games that will assist in the treatment of war-related disorders. One initiative for PTSD employs the Second Life virtual world platform that uses a three-dimensional video game-like virtual setting. Using an anonymous online “avatar,” players can navigate a virtual island that assists them in more clearly understanding the causes and effects of PTSD.

Other initiatives that are early in the development phase show significant promise. One of these is BioZen, a mobile application that when fully developed will provide for its user real-time biometric feedback data from multiple wearable body sensors, displayed on a mobile device. Users can observe relationships between recorded bio-physiological data and their behavior. BioZen represents an important step in advancing behavioral health care and integrating it into other effective health care interventions. BioZen also features a meditation module that represents information, including brain wave data, using customizable graphics to assist users in monitoring their relaxation response. Graphical feedback from the sessions will be generated to allow users to monitor their progress over time.

T2 is also taking direct action to make sure the bridge from “bench to bedside” for their products is as smooth as possible. In October 2011, T2 opened the Technology Enhancement Center (TEC), a sophisticated usability lab that allows developers to thoroughly evaluate how users interact with products under development.

Dr. Gahm concluded with thoughts on technology and the future of behavioral health treatment. As in any field, predicting the future is difficult. A cursory look at technology in the last fifteen years illustrates that point. In a similar manner, mental health treatment will undergo significant change due to advances in technology and medical research. The future of mental health care may no longer include the one-hour treatment session and could be replaced by the use of real-time biometric monitoring and on-demand conversations, regardless of a patient’s location. Such a model would certainly facilitate access and reduce stigma and other aspects of treatment avoidance. Dr. Gahm stated that software developers have repeatedly opened his eyes to ways of moving therapeutic tools into the digital world. It will be important to include various perspectives and disciplines in developing the future treatments that have stymied researchers and experts for hundreds of years.

Plenary and Working Lunch Presentations

Thursday Morning Plenary Talk

Evidence-Based Practice and Comparative Effectiveness

Elise Berliner, Ph.D., Director, Technology Assessment Program, Center for Outcomes and Evidence, Agency for Healthcare Research and Quality

- Clinicians are urged to provide evidence-based practices to their patients, but often lack the information necessary to make empirically informed decisions.
- The Agency for Healthcare Research and Quality's (AHRQ) Effective Healthcare Program conducts and publishes research to provide patients and providers with the information needed to improve the quality, effectiveness and efficiency of health care delivery.

With the proliferation of efficacious therapies for health and mental health conditions, the question for many clinicians and patients is not “What works?” but “Which should I choose?” To assist patients and clinicians with answering this question, the Department of Health and Human Services (HHS) established the AHRQ. As one of twelve agencies within AHRQ’s mission is to “improve the quality, safety, efficiency and effectiveness of health care for all Americans,” and it does this by conducting and supporting health services research, both within AHRQ and externally in academic institutions, hospitals, physicians’ offices, health care systems and assorted other settings. AHRQ attempts to gain greater understanding about clinical practice, outcomes of care and effectiveness, evidence-based medicine, health care quality, organization and delivery of care, health care costs and health care information technology.

In her presentation, Dr. Berliner discussed AHRQ’s Effective Health Care Program (EHCP), the branch that collaborates with individual researchers, research centers, and academic organizations to assist AHRQ in producing effectiveness and comparative effectiveness research for clinicians, consumers and policymakers. They accomplish this by reviewing and synthesizing published and unpublished scientific evidence, funding and generating new scientific evidence and analytic tools, compiling research findings that are synthesized and/or generated and translating them into useful formats for interested stakeholders (see Figure 3).

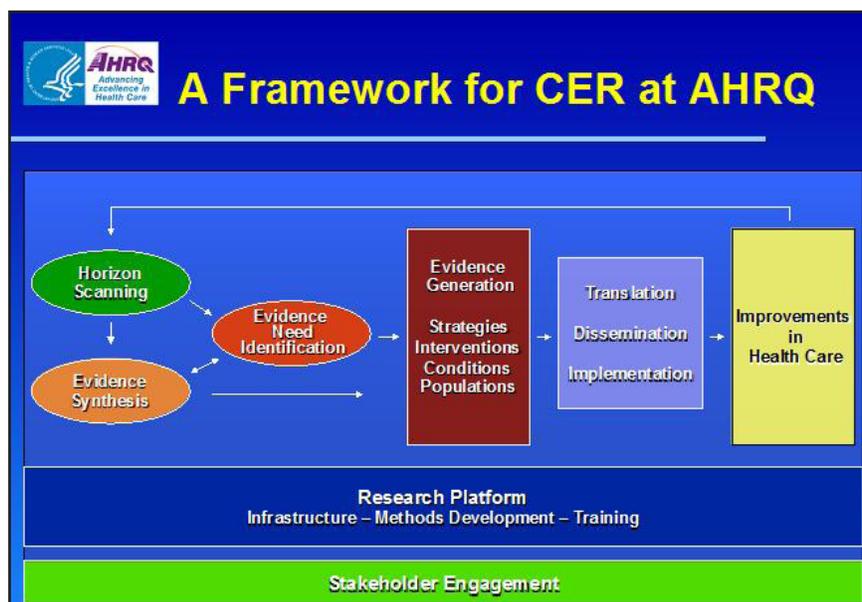


Figure 3. Model of Comparative Effectiveness Research used at AHRQ.

Plenary and Working Lunch Presentations

Through those actions, AHRQ also identifies gaps in research and attempts to provide guidance to researchers on ways to improve existing research to help address the current limitations of the literature. In their analysis of prior attempts at comparative outcome research, AHRQ has determined that its ability to draw conclusions and make recommendations is limited by the fact that many studies are poorly designed and lack the long-term follow-up necessary to determine long-term outcome. EHCP works to counteract this by (1) encouraging clearly delineated parameters of intervention in the study design, (2) utilizing control reference groups, (3) randomizing participants into intervention or control groups and (4) statistically controlling for confounding factors.

EHCP conceptualizes comparative effectiveness research (CER) as the second of three phases of the research-practice translation conceptualization proposed by Dougherty and Conway, 2008 (see Figure 4).

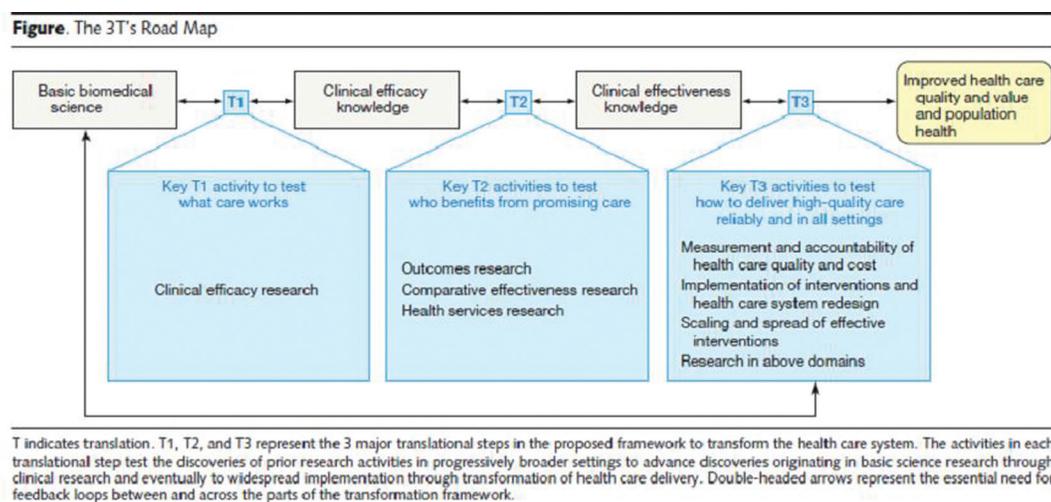


Figure 4. Description of stages of research translation (Dougherty and Conway, JAMA, 2008).

CER comes after basic biomedical science development (i.e., the “bench”) and before health care delivery outcome research (i.e., the “bedside”). The specific framework EHCP uses for conducting CER consists of a continuous loop of (1) reviewing and synthesizing the current literature, (2) identifying gaps, (3) designing and funding research initiatives to address those gaps and (4) evaluating those initiatives. Using this model, EHCP is able to continuously refine its ability to evaluate and compare evidence-based procedures and give quality recommendations to patients, providers and policymakers. Dr. Berliner discussed some of the lessons learned from their efforts, and discussed important issues with regard to heterogeneity of population and research design, incorporation of outside and end-user input and perspective, ensuring adequate refinement of research questions, and ensuring that issues of conflict of interest are addressed.

In order to disseminate their findings, EHCP has many helpful resources, both in print and online. These provide recommendations in easily interpretable formats for clinicians, consumers and policymakers regarding the level of evidence available about interventions and how to incorporate these recommendations into evidence-based medicine. EHCP indicate practices that it determines have a sufficient evidence base on several clearinghouses/exchanges, including National Guidelines Clearinghouse (guideline.gov), Healthcare Innovations Exchange (innovations.ahrq.gov) and the National Quality Measures Clearinghouse (qualitymeasures.ahrq.gov). Also available for researchers are searchable databases of quality outcome

Plenary and Working Lunch Presentations

measures for use in research, and information about the reliability and validity of these measures to aid in making decisions about their inclusion in future research. Future challenges and opportunities for evidence-based practice are to better utilize existing clinical and research data (for example, by ensuring the use of CONSORT statements), to optimize research study designs, and to coordinate research across public and private agencies.

More information can be found online at effectivehealthcare.ahrq.gov.

Thursday Working Lunch Presentation

Sleep Disorders

Anthony Panettiere, M.D., Neurology and Sleep Medicine Physician, National Intrepid Center of Excellence (NICoE)

- Dr. Panettiere presented clinically oriented information on sleep disorders in service members involved in recent conflicts. He discussed the need for providers to understand the features and physiology of normal sleep when assessing sleep disorders, explored the impact of TBI and PTSD on sleep and sleep physiology and reviewed the National Intrepid Center of Excellence (NICoE) clinical case series and NICoE's current approach to treatment.
- It was pointed out that both TBI and PTSD negatively impact sleep, and observations on the complications of assessing sleep function in comorbid patients were presented. Dr. Panettiere also discussed how treating sleep apnea can lead to better sleep architecture, altering brain chemistry and improving mood and psychological functioning.

Dr. Panettiere stated that his assessment of sleep disorders amounts to determining how a service member's sleep may differ from that of a "good sleeper." Good sleepers have quiet sleep on most nights, no snoring and regular dreaming. They feel refreshed in the morning, are wakeful during the day and have no desire to nap or use caffeine. At NICoE, a thorough sleep assessment is performed that includes (1) interviewing the patient's bed partner to assess snoring and restlessness, (2) polysomnograph data, (3) actigraphy data (a method of monitoring daytime sleepiness that uses a wristwatch-like unit to detect motion when a sleep latency test is not appropriate), (4) self-report measures such as the Epworth Sleepiness Scale and (5) body mass index, which is a measure with strong relation to sleep apnea. This thorough assessment allows the NICoE treatment team to fully assess patients and provide solutions that allow them to once again become "good sleepers."

Dr. Panettiere then discussed the relation of TBI, PTSD, insomnia and sleep disordered breathing (SDB is defined as apneas, hypopneas or increased effort of breathing with associated sleep arousals) in service members who have served in OEF/OIF. Research shows that service members with combat-related TBI and PTSD have high rates of disordered sleep, with a significant number having some form of SDB, especially those with a blunt-trauma TBI. Initial findings at NICoE reveal that 41.5 percent of their patients have some form of SDB, and the rates seen at their center are significantly higher than those seen in a comparable civilian population. There is literature on the ways that TBI can increase the likelihood of SDB, including diffuse axonal injury (DAI) to areas closely associated with sleep-wake mechanisms and airway tone, weight gain secondary to decreased physical activity after the injury or poor neck positioning due to pain and injury. SDB is associated with increased health risks (hypertension, heart attack and stroke) and mental health problems (depression, anxiety and PTSD) when compared with similarly matched controls.

Plenary and Working Lunch Presentations

NICoE is noticing similar trends of sleep disorders in patients with TBI and PTSD. The initial analysis of its caseload shows that SDB is common in patients with TBI alone or with TBI and PTSD, but much less common in those with PTSD alone (see Figure 5).

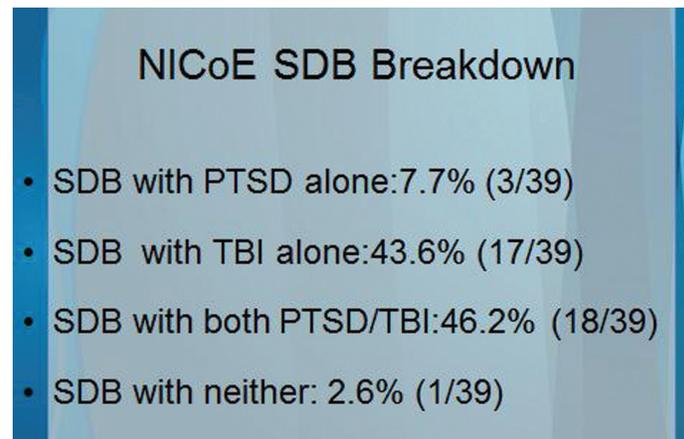


Figure 5. Rates of comorbid sleep disordered breathing in NICoE patients.

This association of SDB with TBI was initially unexpected, but is well explained by the literature on TBI's effects on sleep. Insomnia rates in the NICoE caseload were also high in patients with PTSD alone, TBI alone and both TBI and PTSD (see Figure 6).

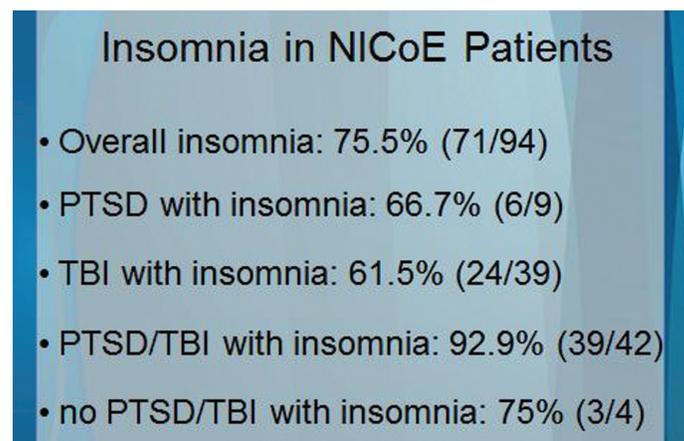


Figure 6. Rates of comorbid insomnia in NICoE patients.

NICoE is developing specific treatments to treat the sleep disorders with which service members present. For SDB, the main intervention is Nasal Continuous Positive Airway Pressure (nCPAP) therapy, a newer generation breathing assistance intervention that modifies pressure with each breath and provides a more natural sleep for the user than the older generation of devices. They also focus on weight loss techniques, positional therapy and alcohol avoidance. To treat insomnia, NICoE has developed a strong behavioral program that works hard to reduce the use of sleep medications and provide patients with restful and regenerative sleep.

Plenary and Working Lunch Presentations

The program involves sleep restriction, stimulus control, light therapy, cognitive behavioral therapy (CBT) for insomnia and regular exercise. Other techniques involved in the behavioral program include treatment of any existing mood disorder and pain, use of a sleep diary, avoidance of time monitoring, sleep hygiene and nightmares treatment with a novel therapy called image rehearsal therapy. Rehearsal therapy uses guided imagery to slowly lessen the intensity and terror associated with nightmares. When necessary, providers at NICoE prescribe prazosin, but have a clear imperative to find non-pharmacological ways to address sleep issues. NICoE offers a fully integrated model of sleep disorder treatment that treats the whole service member, not just his or her symptoms.

In closing, Dr. Panettiere reinforced four main points. The first was that in their review of 94 TBI and PTSD patients seen at NICoE, SDB appears to be more prevalent than that seen in the general population across all assessed age ranges. Second, SDB was more prevalent in subgroups with either TBI (43.6 percent) alone or PTSD + TBI (46.2 percent) than in the group with PTSD (7.7 percent) alone. Third, that NICoE's patient population is unique and not comparable to the general population. Finally, NICoE has found that insomnia is a common symptom (75 percent), most prevalent in the patients who had both TBI and PTSD (92 percent).

Thursday Afternoon Plenary Session

Assessing Risk and Protective Factors for Suicide in U.S. Army Soldiers

Michael Schoenbaum, Ph.D., Senior Director for Mental Health Services, Epidemiology and Economics in the Office of the Director, National Institute of Mental Health; Senior Economist, adjunct, RAND Corporation; Research Associate, Population Studies Center, University of Michigan

- Dr. Schoenbaum presented information on the ARMY STARRS project that will attempt to identify factors that are protective of a soldier's well-being and those that negatively impact their mental health.
- Initial findings of this project were discussed, including data on the overall increase in soldier suicide death rates, an examination of the different suicide death rates in soldiers with different deployment histories, and if the increase in recruitments requiring a waiver is contributing to the increase in suicide deaths.

Dr. Schoenbaum began his plenary talk with an outline of the societal impact of suicide that shows it to be a significant public health problem in both civilian and military populations. To address this issue, ARMY STARRS has been developed to guide data-driven methods to lessen or prevent suicide behaviors and improve soldiers' overall mental health and functioning. Their efforts include (1) the identification of salient risk and protective factors, (2) informing the development and testing of empirically derived interventions and (3) the rapid delivery of actionable findings. Funded by grants from the National Institute of Mental Health (NIMH), ARMY STARRS is a consortium of the Department of the Army, NIMH and four academic research institutions: Harvard Medical School; University of Michigan; Uniformed Services University of the Health Sciences; and University of California San Diego School of Medicine.

The ARMY STARRS study design is based on a similar method used to great effect in heart disease research. Started in 1959, the Framingham Heart Disease Study resulted in reduced mortality rates and the development of impactful and cost-effective treatments and prevention strategies. In a similar manner, the ARMY STARRS study design will collect a wide number of variables that potentially could contribute in some form or manner to suicidal behaviors in a broad population sample. Similar to the Framingham Heart Disease Study and other public health/infectious disease research, the ARMY STARRS design will not presuppose that there is a single underlying causal factor of suicide but will allow for the detection of many underlying factors.

Plenary and Working Lunch Presentations

The current ARMY STARRS study requires voluntary participation by either regular Army or reserve soldiers currently on active duty. Personal information is removed and identifiers are scrambled. The Army will not have access to participants' information in any identifiable way. To address soldiers at risk for imminent harm to self or others, there will have to be a safety plan to meet clinical and ethical obligations and preserve as much of their confidentiality as possible.

There are several components of the ARMY STARRS program. There is extensive use of administrative data being collected by the Army, and the goal is to maximize the use of this data for the extensive information it provides. The five components include:

1. The collection and analysis of historical Army and Defense Department data from active duty soldiers about suicides, suicide incidents and other events between 2004 and 2009. Data from 1.6 million soldiers will have been drawn from approximately 39 existing databases totaling greater than 1.1 billion data records. The databases will be linked to combine data on individuals. The data is de-identified and does not require informed consent for its use.
2. A new soldier study is being created that will assess health, personal characteristics and experiences prior to joining the Army. This initiative will draw information from a basic training sample at three of the four Army basic training sites. Participants take two 75-minute surveys covering health and mental health history; spirituality; substance use; family history; social support; self-identity and other variables. The assessment will also include dimensions of cognitive performance that researchers suspect may be linked to suicidal behaviors. Of the 55,000 soldiers to be recruited, 25,000 will provide blood samples with the intent to study genetic phenomena. As of November 2011, data collection was about one-third complete, with 16,376 new soldiers and 2,241 blood samples.
3. An all-Army sample to assess soldiers across all phases of Army service. Launched in January 2011, it draws from a representative sample of active Army units that are located CONUS, OCONUS and in-theater. Assessment of all soldiers in a given unit will be attempted. Data collection is computerized at nine sites and collected using paper and pencil at 22 sites. Participants take part in one-hour-long surveys with consent to link matching Army/Defense Department administrative data. The goal is to enroll 35,000 soldiers; (12,111 had been recruited as of Nov. 5, 2011). The survey questions are similar in content to the new soldier study but without the cognitive assessment and blood sample collection. The survey has additional questions about deployment history, unit experience/cohesion and weapon ownership.
4. A soldier health-outcomes study is planned to assess suicide-attempt survivors, suicide decedents and demographically matched controls. For one component of the study, suicide-attempt survivors hospitalized in five military treatment facilities will be interviewed. The second component will assess suicide decedents by an interview with the next of kin and their Army supervisors. Comparison "control" soldiers will be selected from the all-Army sample.
5. Based upon initial findings, special study aims using additional neurocognitive tests on soldiers who attempted suicide and matched controls will be conducted to try to replicate previous research done in civilian emergency room populations.

One of the first questions asked by the ARMY STARRS team is how the rates of suicidal behaviors in the Army compare to the civilian population. Although there has been an increase in suicides in the Army, some researchers have proposed that the rising rate merely reflects the rising rate in society in general. To examine

Plenary and Working Lunch Presentations

this question, they compared the ARMY STARRS data to a civilian sample matched for age and gender. The preliminary data from ARMY STARRS suggests that the Army suicide rate has increased when compared to similar civilian populations. This research will assist military leadership in making essential changes (see Figure 7).



Figure 7. Army suicide rate compared to a comparative civilian sample.

Dr. Schoenbaum also presented some preliminary findings on the rate of suicide deaths by three categories of deployment history: (1) currently on deployment, (2) previously been deployed, and (3) never been deployed. The ARMY STARRS team has found different rates, and the findings are displayed in Figure 8.

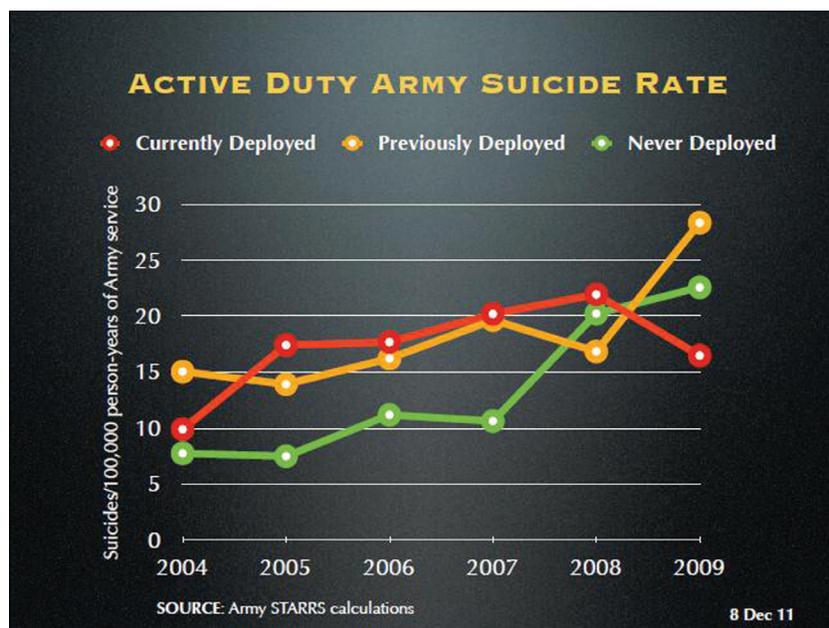


Figure 8. Suicide rate broken down by deployment status.

Plenary and Working Lunch Presentations

The ARMY STARRS project research team has also conducted a preliminary analysis of whether a change in recruitment standards (determined by whether a soldier needed a waiver for medical reasons, prior drug/alcohol use, or legal/conduct problems) is contributing to the increase in the suicide death rate. Although the rise in waivers parallels the rise in suicide rates, the ARMY STARRS team has determined that there is no association based on the fact that (1) there is no difference in the suicide death rate of waiver/non-waiver enlistments matched for time and date of service and (2) the number of suicide deaths in the waiver group is insignificant in comparison to the overall suicide death rate (38 total for waiver group versus 359 for the no-waiver group).

Dr. Schoenbaum concluded by mentioning that the ARMY STARRS project is the largest suicide event study of this kind ever undertaken. It has the potential to be a major advancement in the study of suicidology and will hopefully reduce the occurrence of this public health problem. More information on the ARMY STARRS project can be obtained at the website armystarrs.org.

Friday Morning Keynote Address

Recent Advances in the Psychological Treatment of PTSD

Terry Keane, Ph.D., Director, Behavioral Science Division, National Center for PTSD; VA Boston Healthcare System; Professor, Vice Chairman of Psychiatry, and Assistant Dean for Research, Boston University School of Medicine

- Dr. Keane described his conceptual model of PTSD, the available evidence-based psychosocial treatments for PTSD and the elements that he believes are present to varying degrees in all effective treatments
- Information on how to reduce barriers and improve access to PTSD treatment for service members and veterans was provided. Related to this, Dr. Keane discussed an internet-based intervention entitled, “Web-Based Intervention for Returning Veterans with Symptoms of Posttraumatic Stress Disorder and Risky Alcohol Use” that successfully used social media for study recruitment at a significant cost savings to traditional enrollment methods. Initial results are positive, and a discussion was presented on how this new technology can be implemented to improve care.

Dr. Keane started his plenary talk with a description of his model of the etiology of PTSD. He believes that PTSD is likely an anxiety disorder resulting from an acute activation of the fear circuitry following exposure to trauma that is exacerbated by various and biological and psychological risk factors. Exposure to trauma triggers an appropriate physiological alarm response that is then pathologically generalized to other similar but not dangerous situations. The alarm response is highly unpleasant, leads to apprehension of any situation (real or learned) that arouses it and creates subsequent avoidance behaviors and/or ineffective emotional numbing techniques. This eventually leads to PTSD (see Figure 9).

Plenary and Working Lunch Presentations

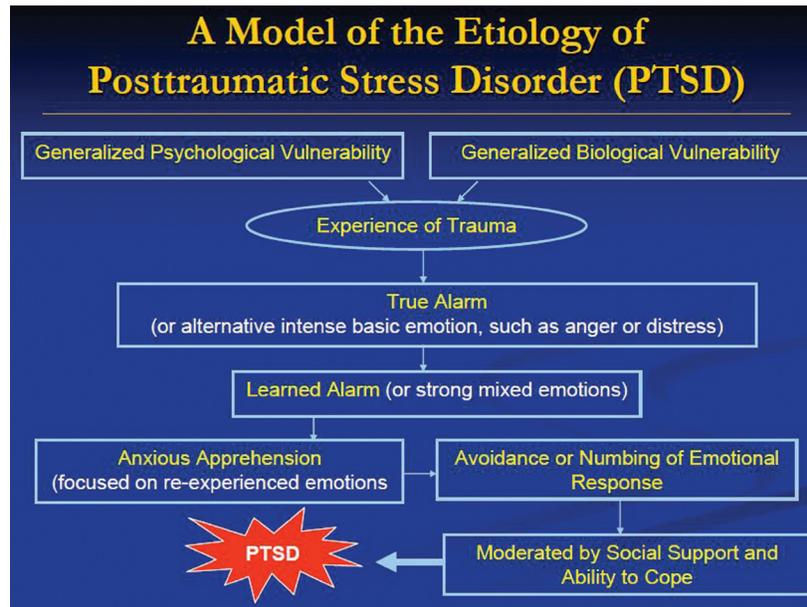


Figure 9. Dr. Keane's conceptual model of the etiology of PTSD.

As pointed out by numerous presenters at this conference, Dr. Keane stated that the rate of co-occurring conditions in military and veteran populations is high. Pain, TBI and PTSD are sometimes referred to as the signature wounds of the OEF/OIF cohort, with 42.1 percent of a recent sample of 340 OEF/OIF veterans experiencing all three. He feels that this high rate of comorbidity is telling, and is a clear indication that the simultaneous treatment for these conditions needs to be performed in an integrated manner.

Dr. Keane then discussed the evidence-based treatments for PTSD. Fortunately, there are several psychological treatments that have been shown to be effective with military and veteran populations. Some of the more commonly known treatments were discussed (e.g., exposure therapy, cognitive therapy, anxiety management, cognitive processing therapy, eye movement desensitization and reprogramming [EMDR]), and he presented data on their effectiveness. In addition, he discussed new and promising therapies such as narrative exposure therapy, a technique that is simple to execute and requires less professional assistance than the existing evidence-based therapies, potentially allowing a greater number of people to be treated at a much reduced cost. The processes involve bringing the service member or veteran into the treatment setting and, after a brief instruction by a staff member, having them write about traumatic event(s) with a focus on the emotional response they had to the event(s). After completing their writing, they read it over repeatedly or read it to another person. Research is still being conducted on this method, but initial results are very promising and it has great potential to provide further options to military and veteran populations seeking treatment for PTSD. Dr. Keane mentioned that pharmacological treatments (e.g., TCAs, MAOIs, SSRIs, mood stabilizers and anti-anxiety agents) have not had the same level of success in treating PTSD. He also noted that there is continuing research that may soon reveal effective treatments for the insomnia that negatively affects the well-being of many service members and veterans.

Dr. Keane listed what he views are the common elements in effective treatments for PTSD. Those are (1) disclosure of elements of the traumatic experience, (2) direct therapeutic exposure to those events to counter the avoidance strategies, (3) education about trauma and PTSD, (4) some form of cognitive restructuring of key distortions, and (5) skills for anxiety management. There is no evidence that any one of these is more

Plenary and Working Lunch Presentations

important than the other, and there is no guidance on which of these factors should be used in combination with the others. As such, there is no premier treatment for PTSD, and the fact remains that there are many who do not respond to a single course of one of the available evidence-based treatments for PTSD. In acknowledgement of this fact, Dr. Keane pointed out that there are many roads to recovery, and in order to reduce barriers to care and improve outcomes, treatment professionals should understand that they need to be flexible and relentless in their application of treatments and the use of the above-listed elements of treatment.

Dr. Keane presented information on a web-based intervention that he thinks may be a major breakthrough in providing treatment for military and veteran populations. The “Web-Based Intervention for Returning Veterans with Symptoms of Posttraumatic Stress Disorder and Risky Alcohol Use” is a research project that has built a web-based treatment program for returning veterans with alcohol problems and symptoms of PTSD. Dr. Keane was excited about this project because it has the ability to reach veterans who may have difficulty accessing treatment because of distance or insufficient free time during treatment hours. The computerized program used in this project facilitates the delivery of the program in a standardized manner, and can be used by many more people than can be seen by a mental health provider and at a lower cost. Preliminary results are very positive. Participants who engaged in eight 20-minute computer-guided sessions reported a 50 percent reduction in the number of drinks they consume per week (28 to 14). This suggests that internet-based therapies may be effective in providing treatment for veterans with PTSD and problematic substance use.

Another reason for his excitement was the effective use of social media to recruit participants for the study. Using available web technologies, the study team was able to use recent website visits and available demographic data regularly accessed by web marketers to target advertisements on Facebook to select individuals likely to meet study criteria. Clicking on the ad brought them to the study site (vetchange.org), where they could enter information and see if they qualified. The end result was that 600 eligible participants were recruited in 30 days at a rate of \$30 dollars per participant versus \$150-\$250 using traditional methods.

Friday Morning Plenary Talk

Major Depressive Disorders

Col. (Ret.) Elspeth Ritchie, M.D., Ph.D., Chief Clinical Officer, Department of Mental Health for the District of Columbia

- Dr. Ritchie presented clinically focused information to help Defense Department and VA clinicians treat major depressive disorder (MDD) in patients who partially or poorly respond to initial treatments. She stated that improvement in symptoms is not sufficient, and that the gold standard of treatment in MDD is remission and return to full function. MDD is an important clinical issue for military and veteran populations and is highly comorbid with other Axis I disorders as well as Axis II and III diagnoses. It is often unrecognized and undertreated.
- Risk factors for depression in military populations include relationship events, legal or employment problems, substance abuse, pain or disability. Access to weapons, especially firearms, poses additional risks. Recent trends indicate that depression is increasingly common among older, higher-ranking women in the military.
- Treatment for MDD should include a plan for the acute phase as well as addressing residual issues (e.g., sleep problems, weight gain, sadness, fatigue) with the goal of full remission.

Plenary and Working Lunch Presentations

Dr. Ritchie started her presentation with information on the high prevalence of MDD in service members and veterans who served in recent conflicts, and its strong effect on impairment, morbidity, and well-being. As is true in other populations, depression is commonly overlooked by providers who treat service members and veterans, and many who would greatly benefit from medications or therapy are left untreated. Depression is a strong risk factor for suicidal behaviors in military and civilian sectors, and the predictors of suicide in the general population were contrasted with those in military populations. While noting that major psychiatric illness is not a contributing factor for military populations, ownership of a firearm is a stronger predictor than it is for civilians. In addition, there are increasing trends in the proportion of older, higher ranking and female service members engaging in suicidal behaviors. She mentioned that providers should pay careful attention to changes in factors related to their patients' active duty status (e.g., poor evaluation, pain or disability that affects physical strength, missing promotion, etc.) because of their strong impact on service members' self-identity and sense of worth.

Given the high occurrence of partial or non-response to treatment in patients with depression, Dr. Ritchie proposed designing a treatment plan that takes into account poor or partial treatment response and allows for adjustments as needed (see Figure 10). In addition, she recommended considering other modalities, such as exercise, phototherapy, dietary supplements, neuromodulation therapy such as electroconvulsive therapy (ECT), vagus nerve stimulation (VNS) and transcranial magnetic stimulation (TMS), and an area of research for her, therapy dogs.

Medication is one of the necessary aspects of developing a treatment plan for MDD, and Dr. Ritchie discussed factors in choosing an effective medication strategy. Currently, there are "no replicable or robust findings to establish a clinically meaningful difference" between the newer frontline medications" (e.g., SSRIs, SNRIs, mirtazapine, and bupropion, etc. [American Psychiatric Association, 2010]). Given this finding, Dr. Ritchie offered several helpful guidelines: select medications based on side effects; the first choice may depend on other symptoms the patient is experiencing (e.g., sleep problems or weight gain); be familiar with brand names and generic names and their side effects; be aware of which side effects are most problematic for patients (e.g., sexual dysfunction may be unacceptable for younger patients, and weight gain may be unacceptable for active duty patients); spend time establishing a therapeutic alliance so patients can tell you about problems with medication compliance; and don't push patients to take a medication if they do not want to do so.



Figure 10. Guidelines for treating non-responsive depression.

Plenary and Working Lunch Presentations

It is important to track changes in depressive symptoms and severity over time to gauge the effectiveness of the treatment plan, and Dr. Ritchie encourages the use of measures-based assessment throughout treatment. Several valid and reliable clinical scales and screening tools may be used and repeated (e.g., PHQ-9 or PHQ-2). After two to four weeks, a drug may not have started working or the patient may become intolerant of side effects, and at that point the provider should consider an alteration to the treatment plan. One option is substitution/switching, which should involve a careful transition to a new medication. Combination therapy may be an option when there is only a partial response to a medication, and providers should be aware of possible drug-drug interactions or potentially helpful synergy between combined medications.

For patients not responsive to other medications, adjunctive therapy may include Lithium, which is effective for treating depression and protective against suicide and is especially useful if there are bipolar features like impulsivity. There is a risk for toxicity with Lithium, so it may not be used on service members going on deployment. Additional adjunctive therapies include thyroid hormone and atypical or second-generation antipsychotics. There is evidence suggesting that the latter are helpful in treating depression as well as trauma-related nightmares. Side effects include weight gain, risk for stroke, diabetes and hypertension, and providers need to balance the need for treatment with them.

Psychotherapy augmentation may be helpful for mild to moderate depression, although it is not sufficient alone for patients having severe depression with risk of suicide. Additional treatment modalities, some for which scientific support is currently lacking, include exercise, phototherapy, dietary supplements, neuromodulation like ECT, therapy dogs and acupuncture. In conclusion, Dr. Ritchie recommended that military health care providers make use of resources available for the treatment of major depressive disorders, including the new *Combat and Operational Behavioral Health* book available free from the Borden Institute (bordeninstitute.army.mil/published.html).

Friday Working Lunch Presentation

Real World Implementation and Training for Evidence Based Psychotherapies Dissemination and Implementation of Evidence Based Psychotherapy in the VAHCS

Brad Karlin, Ph.D., National Mental Health Director for Psychotherapy and Psychogeriatrics, Department of Veterans Affairs Central Office, Washington, DC

- Dissemination and implementation of evidence based psychotherapies (EBPs) is a priority of the Veterans Health Administration, and a number of policies and programs have been implemented at the patient, clinician and systems levels to support EBPs.
- Evaluations of training programs in EBPs indicate significant improvements in both clinician proficiency of manualized treatments and patient outcomes.

Dr. Karlin started his plenary talk outlining the challenges to implementing EBPs in organizations such as the Veterans Affairs Health Care System (VAHCS), noting that maintaining a strong emphasis on training and consistent systemic/organizational support are common stumbling blocks to successful implementation. When EBPs are implemented without adequate training or support, they are often delivered with low fidelity that impedes effectiveness. To address this, the Veterans Health Administration (VHA) instituted a system-wide policy mandating that VA care provide access and capacity to conduct specific EBPs for behavioral health issues commonly treated at VA facilities. These EBPs were cognitive processing therapy (CPT) or prolonged exposure (PE) therapy for PTSD; cognitive behavioral therapy (CBT), acceptance and commitment

Plenary and Working Lunch Presentations

therapy (ACT) or interpersonal psychotherapy (IPT) for depression; and social skills training (SST) for severe mental illness (SMI). VHA policy also requires facility capacity to include EBPs for substance use disorders (SUD) and behavioral health conditions. In addition to these mandated therapies, the VA offers training in EBPs for relationship distress, insomnia and motivational interviewing.

The VA training model is competency based. It starts with an in-person, experientially based workshop, and is followed with ongoing weekly consultation with a supervisor or mentor to build mastery and facilitate implementation of the treatment. In addition, there are informal consultation opportunities that can be implemented over the longer term outside of formal and structured implementation, including electronically based “virtual office hours” with a remotely located expert, and local peer consultation groups. To date, over 5,000 VA staff have received training in one or more EBPs through the VA’s training program.

A number of clinical strategies have been utilized to ensure successful implementation of EBPs in VA settings. Dr. Karlin discussed strategies targeted at the patient level. They include educating veterans about the EBPs and the benefits of taking part in them, a tactic that also promotes informed patient choice. Other strategies include socializing veterans who may not be psychologically minded to the proposed treatments through the use of motivational enhancement at the beginning and throughout treatment, and most importantly, placing a strong emphasis on the therapeutic relationship. Dr. Karlin also mentioned strategies targeted at the systems level to promote a local infrastructure that supports EBP delivery. These strategies include measures that increase motivation among clinicians to prioritize EBPs and fostering an environment that encourages frontline providers to become champions for the EBPs. To facilitate EBP implementation on the systems level, the VA has placed a local EBP coordinator at each medical center. In addition, clinician EBP “success stories” help to bring about an environment that is supportive of adaptation and is effective in influencing fellow clinicians in a way that hierarchical directives cannot.

An important component of implementing EBPs is evaluation of all aspects of the initiative, including therapist outcomes, patient outcomes, measures of the therapeutic alliance and long-term adoption of the EBP. Therapist outcomes include overall and specific competencies, and clinician self-efficacy. Patient-level outcomes include disorder-specific symptom measures and quality-of-life measures.

National program evaluation results have been positive. Studies examining the effects of the VA’s PE training program revealed significant reductions in PTSD-related symptoms in veterans treated by trained clinicians. Interestingly, there was also a significant drop in depression symptoms when treated with PE. In the investigation of the implementation of CBT for depression, results showed that patients exhibited significant reduction in depression when treated by trained clinicians. In examining therapist outcomes for the training in CBT for depression, therapist self-ratings of competency in the technique went from under 50 percent before training to approximately 80 percent by the end of the training. Significant improvements in therapist skill were seen in all domains of cognitive therapy. An interesting finding from the evaluation of CBT for depression was that Socratic questioning was consistently viewed as the most difficult competency to learn and yet it was the area that showed the greatest improvement with training.

Plenary and Working Lunch Presentations

Friday Working Lunch

Real World Implementation and Training for Evidence Based Psychotherapies Training Providers in Evidence-Based Therapies – Lessons from the Field

*David S. Riggs, Ph.D., Research Associate Professor of Medical & Clinical Psychology,
Executive Director, Center for Deployment Psychology*

- Dr. Riggs discussed the Center for Deployment Psychology (CDP) and its mission to train Defense Department providers in evidence-based therapies for behavioral health. A large number of providers have received training in evidence-based therapies. However, common obstacles hinder the dissemination and implementation of these effective practices.
- Numerous examples of unexpected innovations to standardized treatments were discussed, and subsequent research is supporting the effectiveness of those innovations. A discussion of possible future treatment developments was provided.

The Center for Deployment Psychology (CDP) trains Defense Department providers in evidence-based therapies. Currently they offer training for practitioners in cognitive processing therapy (CPT) for PTSD, prolonged exposure (PE) therapy for PTSD and cognitive behavioral therapy for insomnia (CBTI). Overall, 6,500 providers have attended workshops or courses, and they have trained internationally in 20 different time zones. Survey data show that there is an 85 percent gain in knowledge after workshops, and as a result of their training with CDP, two-thirds of military providers and half of civilian providers who were trained by CDP used evidence-based treatments for PTSD. Eighty-five percent of them said it was helpful for the patients they treated.

Despite this positive record, Dr. Riggs reported that there are significant individual and systemic obstacles that hinder the implementation of evidence-based practices. He stated that it is common for providers to falsely assume that they already know how to deliver the treatment and (1) have doubts about their ability to perform the treatment in the existing military health care system and question if the system will support it, (2) question whether the treatments are going to work or will work better than their current practices and (3) wonder if the treatment will actually make the situation worse for the service member, especially with prolonged exposure. In addition, there are systemic challenges to dissemination in the military, including a lack of centralization to help encourage and enforce implementation, varied levels of implementation and standardization across the different settings and branches of the military, a highly transient provider population who have numerous job responsibilities and full caseloads and challenging treatment settings, especially on deployment. Most experts in the field of training practitioners think that implementing evidence-based practices takes a long-term, supportive approach that provides ongoing coaching to build the necessary skills, and the stressful, constantly changing military settings can work against those factors.

Nonetheless, Dr. Riggs displayed some preliminary data showing that service members treated for PTSD by providers who were given basic training in evidence-based treatment for PTSD – but without any follow-on consultation or support – had significantly lower levels of symptoms than service members treated with non-evidence-based methodologies. Dr. Riggs stated that the research shows that coaching and follow-on mentoring are important elements in the effective dissemination of evidence-based practices and personally thinks it is important for lasting implementation. However, he also mentioned that future research may discover ways to effectively implement evidence-based therapies without the intensity of follow-on training and support found in many large-scale dissemination and implementation projects.

Plenary and Working Lunch Presentations

Another significant finding is that there are numerous modifications that are being made to evidence-based treatments because of the limitations of deployment settings, and instead of lessening their effectiveness they are actually leading to innovations that may result in new and effective modes of treatment. For example, conducting PE in Afghanistan has led to using video teleconferencing (e.g., Skype) due to geographical limitations, and preliminary research being done at the Charleston VAMC suggests that this modality is effective. Another example is the timing of PE sessions. Due to operational limitations in the deployment setting, practitioners are doing daily exposure sessions due to limited time for treatment, and preliminary results from a study examining this form of delivery suggest that this massed form of PE is as effective as weekly sessions.

Currently, Dr. Riggs considers the Center for Deployment Psychology as effective in disseminating information on evidence-based practices to providers. What they have not been able to do is get institutional support for their efforts from the military hierarchy. There have been successes, but most of those have come from energetic individuals who have championed these therapies. In conclusion, Dr. Riggs stated that the success of any initiative only works if the whole system adjusts to support it, including the infrastructure, internal consultants, external consultants/trainers and military leadership.

Thursday Afternoon Breakout Sessions

Substance Use Disorders

Substance Misuse and TBI: Opportunities for Strategic Interventions

John D. Corrigan, Ph.D., ABPP-RP, Department of Physical Medicine and Rehabilitation, Ohio State University

- Dr. Corrigan pointed out the gaps in the research on the treatment of co-occurring TBI and substance use disorders (SUD). Commonly, these disorders are treated in a parallel manner and with no communication between the different providers.
- Based on a treatment model of treating comorbid SUD and serious mental illness, a four-quadrant model of treatment was proposed, using high- and low-severity of SUD and TBI determining the treatment quadrants.

TBI is associated with a host of negative outcomes, including unemployment, criminal activity, depression and overall lower subjective well-being. In addition, it seems TBI operates synergistically with factors that negatively impact well-being, such as substance use disorders. Dr. Corrigan reported that his research reveals that the relationship between TBI and SUD causes an “adverse selection cascade,” in that intoxication leads to a higher likelihood of TBI, and TBI can lead to higher levels of substance use, with the severity of TBI and SUD increasing as the cycle continues. Research on civilian populations shows that between 48 and 63 percent of patients in TBI rehabilitation have a history of SUD prior to their injury, and there is a high rate (30-50 percent) of problematic drinking one year after the injury, with at least 5-10 percent initiating problematic substance use for the first time after a TBI.

In addition, research suggests that TBI and SUD worsen each other’s impact. Findings suggest that most TBIs consistently impact the frontal lobes, regardless of the point of impact to the head due to certain bone structures in the skull. This leads to an impaired link between the frontal lobes and the mid-brain areas involved in memory consolidation (e.g., the nucleus accumbens), something that research shows is strongly linked to how rewards and consequences are assessed and is a major contributor to the development and maintenance of a substance use disorder. A significant number of people with this co-occurring condition who are drinking problematically one year after treatment for TBI are not getting assistance. In addition, there are consistent clinical observations by providers treating SUDs in patients with TBI that make standard SUD treatment ineffective: (1) compared to others in SUD treatment, there is an even greater disconnect between their intentions and their behavior and (2) patients with TBI are more likely to prematurely discontinue treatment, often after being characterized as non-compliant

Despite the clear need for specialized treatment programs for TBI and SUD, there is painfully little study of the effectiveness of proven behavioral, pharmacologic or systemic treatment interventions with this population. Dr. Corrigan pointed out that the initial treatment models for patients with TBI and SUD were designed for residential settings with a coordinated treatment plan. However, many of the current treatment models attempt to address all of the patient concerns without sufficient provider collaboration, a pattern that can cause iatrogenic treatment effects. Borrowing from the literature on treating comorbid substance use and severe mental illness (SMI), Dr. Corrigan described a two-by-two grid to outline general categories of patients and appropriate treatment for that group (see Figure 11). This quadrant model divides patients with SUD and TBI into low- and high-severity categories, and outlines the most appropriate treatment setting for them and the recommended intervention.

The first quadrant, low-severity TBI and SUD, is most appropriately handled in acute/primary care medical settings, and employs screening measures and the brief intervention (BI) model. The BI model is a short-term,

Thursday Afternoon Breakout Sessions

opportunistic, counseling and referral-based intervention conducted in a medical setting (e.g., physician's office, emergency department, trauma program) that employs many of the principles of motivational interviewing to enhance motivation to address problematic behaviors and increase patient collaboration in treatment decisions. Clinical trials support both the efficacy and cost-effectiveness of the BI model in treating less severe alcohol problems. This quadrant does not require specialized staff or treatment coordination, and is designed to be handled by the existing staff in various medical settings as a routine part of care for someone who screens positive for a low-intensity SUD and TBI disorder. The second quadrant, low SUD severity and high TBI severity, is best handled in rehabilitation programs and services, and the recommended interventions are patient education, screening, brief intervention and linkages to services to address functional deficits. In this quadrant, treatment of the SUD plays a secondary role to treating the TBI and the deficits it engenders, with the rehabilitation staff leading the overall treatment design role while consulting closely with a substance use counselor. The third quadrant, higher-severity SUD and lower-severity TBI, is best handled within substance use treatment programs, recommended interventions are screening, SUD treatment accommodation for cognitive deficits and linkage to outside treatments, as necessary. In this model, the substance use counselor is in charge of directing the treatment plan, but screens for TBI and accommodates treatment to account for TBI deficits that are commonly viewed as non-compliance or lack of motivation for treatment (e.g., memorizing steps, writing moral inventories, etc.). The fourth quadrant, severe TBI and SUD, calls for treatment best conducted in a specialized TBI and SUD treatment service, and the recommended intervention is a highly integrated treatment program that accounts for the cognitive deficits and propensity of TBI patients with impulse-control problems to drink problematically. In this quadrant, the provider has expertise in both areas as well as their interactions.

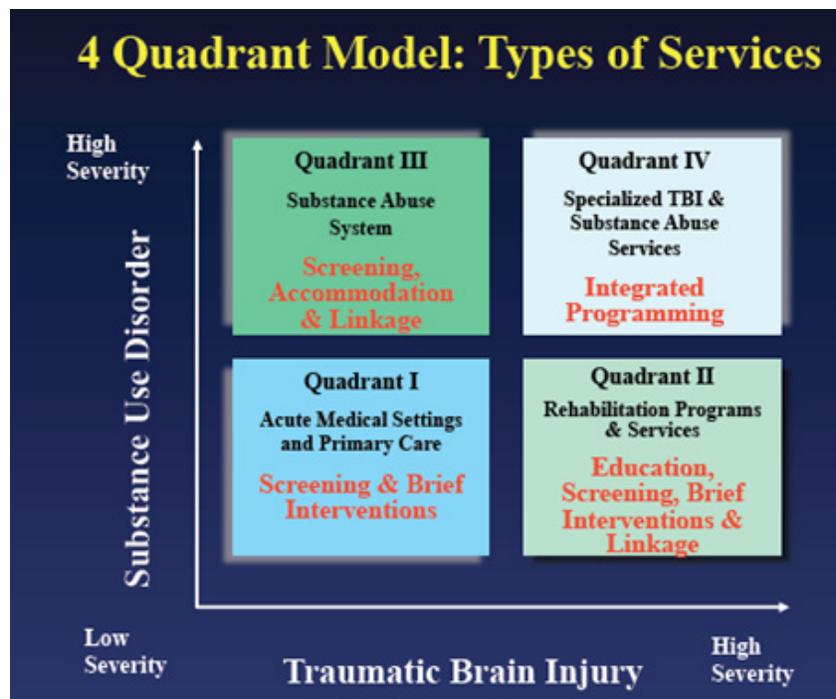


Figure 11. Four quadrant model for treating TBI based on comorbid SMI and SUD.

Thursday Afternoon Breakout Sessions

Dr. Corrigan outlined seven factors that his research shows are very important in treating co-occurring TBI and SUD: (1) SUD treatment and TBI rehabilitation need to be interwoven, not sequential and not just parallel (a lack of coordination can have a negative impact on treatment); (2) Treatment must be holistic and address all aspects of lifestyle, not just TBI and substance use; (3) Staff need to be skilled in working with both TBI and substance use disorders because of symptoms that are influenced by both disorders; (4) Treatment is most effective when patients and clinicians collaborate to develop an individualized treatment plan; (5) Treatment must have the flexibility to provide different services at different times to address changing needs; (6) Clinicians need to use specific listening and counseling skills that are empowering and collaborative to help patients develop awareness, hopefulness and motivation for recovery; and (7) Programs need to hire more experienced staff, give them smaller caseloads, and realize that this co-occurring disorder usually requires longer-term treatment. Several programs that use these principles were mentioned, including the SUBI Project in Toronto (subi.ca) and the Ohio State University TBI Network (tbetwork.org).

A review of the variations of screening and brief intervention (SBI) was provided, with a particular emphasis on how this model might impact the treatment of co-occurring TBI and SUD. The most studied models are the World Health Organization's brief intervention model for primary care that is currently being promoted by the Center for Disease Control and the National Institute on Alcohol Abuse and Alcoholism and the FRAMES model developed by Gentilello and colleagues at the University of Washington for use in emergency departments and trauma centers. Dr. Corrigan reported that SBI will soon become the standard of care for not just substance use but all behavioral health conditions, with the National Quality Forum recommending its use in emergency, inpatient and ambulatory health care settings and the The Joint Commission (TJC) on Accreditation of Healthcare Organizations (JCAHO) incorporating it into their evaluation framework. There is strong literature showing that SBI is associated with significant reductions in health care usage (see Figure 12).

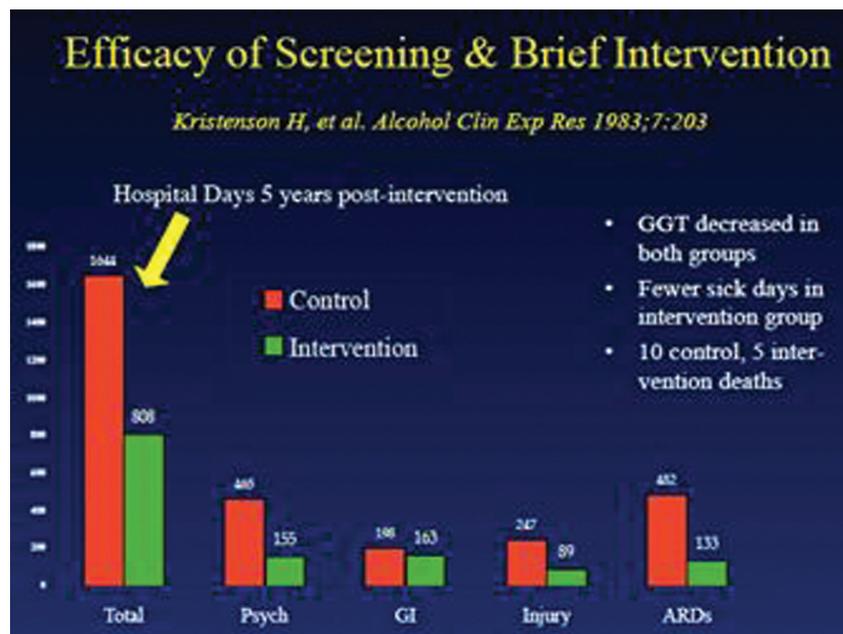


Figure 12. Results from classic study showing benefits of SBI in a population of men with heavy alcohol use (GGT: gamma-glutamyl transpeptidase, alcohol biomarker consumption).

Thursday Afternoon Breakout Sessions

However, questions remain as to how to apply this method to individuals with TBI, including how to address increased confusion and/or diminished cognitive functioning, how to use it in a multi-disciplinary setting, what of the many symptoms or behaviors in this population should be targeted, and at what time in the course of treatment SBI should be used. There is active research assessing the different interventions described by the four-quadrant model to see which are effective and with whom. In summary, Dr. Corrigan made several points about the use of screening and brief interventions for patients with TBI and SUD: (1) SBI may be an important tool for addressing substance use among persons with TBI; (2) There is a need to determine if and how SBI needs to be adapted for persons with more serious TBI; (3) There needs to be an increase in agreement among providers about the recommended level of alcohol use and recommended behaviors; (4) SBI should be considered for both acute and chronic populations; and (5) There is a significant need for more research on these interventions. In closing, Dr. Corrigan provided the following links and an email address for further questions: SynapShots.org; BrainLine.org; corrigan.1@osu.edu.

Cognitive Rehabilitation

Cognitive Rehabilitation

Heather Belanger, Ph.D., ABPP-CN, Clinical Neuropsychologist, TBI/Polytrauma Center, James A. Haley Veterans Hospital

- Mild traumatic brain injury seems to have effects on neurocognitive performance. In general, patients may expect a return of full functioning by three months post-injury. Moderate to severe TBI patients seem to experience the steepest curve of recovery within the first six months post-injury.
- It may be concluded from cognitive rehabilitation studies that treatment should include both restorative and compensatory strategies, and providers should move from multidisciplinary to interdisciplinary treatment approaches.
- A stepped-care approach to the treatment of mild TBI begins with education, then a focus on presenting symptoms, patient self-care and somatic symptoms, then irritability and impulsivity, and finally persistent cognitive issues.

Cognitive rehabilitation is difficult to define. The definition shared by the Brain Injury Association of America and the Commission on Accreditation of Rehabilitation Facilities focuses on activities aimed at improving patient functioning. Historically, there have been two approaches to cognitive rehabilitation therapy (CRT): (1) the restorative, or top-down, approach with the goal of improving the underlying brain capacities and (2) the compensatory, or bottom-up, approach with the goal of developing strategies to circumvent impairments in daily life. Studies comparing the two approaches have found that both treatment groups may improve in cognitive outcomes, although it is unclear how they differ in behavioral-functional outcomes such as employment. There are many factors involved in matching the right treatment for TBI patients, including the severity of the injury and the time since the injury occurred (see Figure 13).

Thursday Afternoon Breakout Sessions

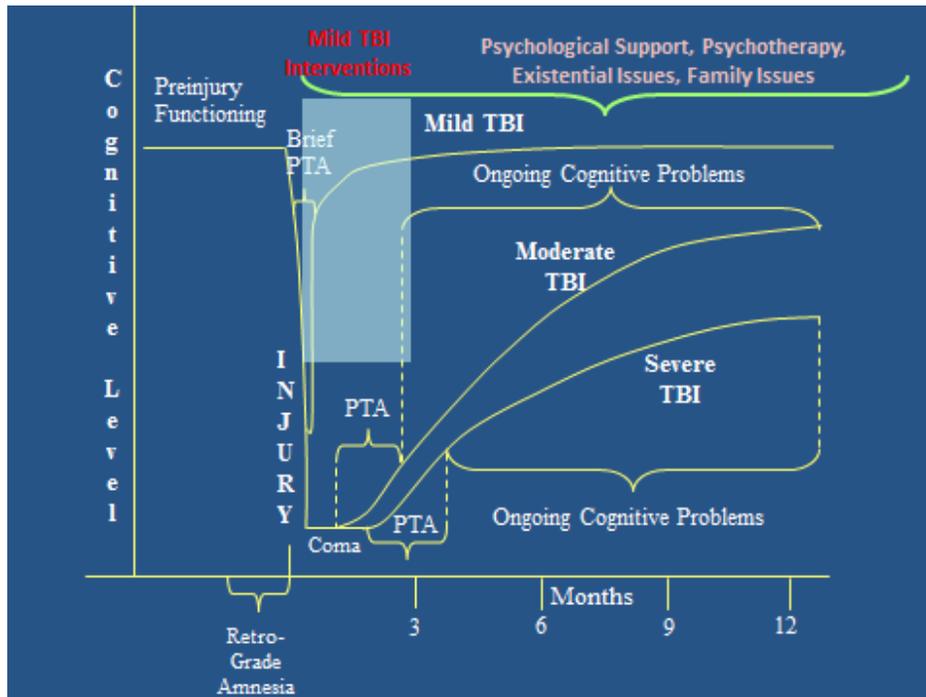


Figure 13. TBI factors including severity and time since injury.

The literature on the efficacy of CRT for TBI is still in development, and currently there are a limited number of reviews to inform science. A classic review of the TBI treatment literature concluded that CRT may help improve memory, reduce anxiety and improve self-concept, although they concluded that the durability of such effects could not be determined. These findings were confirmed by later reviews, which also included several recommendations for clinical practice, including direct attention training, memory strategy training, executive function strategy training, treatment of social communication and comprehensive or holistic treatments focusing on emotion regulation.

However, controversies followed a recent review of the literature on CRT for TBI that concluded that the inconsistency of study methods negatively impacts the ability of science to support CRT for TBI, a finding that TRICARE used to deny payment for CRT. To address this controversy, the Institute of Medicine (2011) reviewed approximately 90 CRT studies, not restricted in terms of randomization or TBI severity, and concluded that there is sufficient evidence to support the use of CRT for TBI, and did provide recommendations on specific treatments similar to those recommended by Cicerone and colleagues. However, The Institute of Medicine did point out that further research is needed in this area to improve treatment recommendations and clarify the consensus on treatment, and pointed out several treatment issues that make research difficult, including the unique treatments needed for each mild TBI patient, rapid levels of change in function and the need for multiple services.

Cognitive rehabilitation treatment for mild TBI often begins with educating patients to generally expect no long-term sequelae of their injury, although there may be issues of selective attention and transient stress responses. Treatments may be symptom-based, may focus on behavioral health, such as improved sleep, diet and exercise, and may include cognitive-behavioral therapy for mood disorders. The majority of what is known about the effectiveness of cognitive rehabilitation strategies is based on civilian samples, and it is yet unclear if these treatments are appropriate for veterans.

Thursday Afternoon Breakout Sessions

Dr. Belanger discussed numerous best practices for treating TBI patients, including those for attentional deficits and memory problems (using internal and external compensation). Also presented were (1) the direct and indirect treatment of executive function problems and communication problems, (2) patient/family education (particularly for mild TBI), (3) the use of external aids and (4) the use of environmental modifications. In addition, an exhaustive list of treatment modalities was reviewed, including memory strategy training, errorless learning, executive function treatment, executive strategy training and the treatment of social communication.

Implementation Science

Implementing New Models of Mental Health Care for Veterans: Lessons from the Field

David Atkins, MD, MPH Director, QUERI Program, Office of Research and Development, Veterans Health Administration

- The VA's QUERI initiative is a unique research initiative that finds gaps in performance and works to implement and evaluate evidence-based treatments. QUERI researchers strive to improve health care for veterans by studying and facilitating the adoption of new treatments, tests and models of care into routine clinical practice.
- In operation since 1998, QUERI has gained valuable information on effective ways to implement new techniques and some of the unforeseen challenges in implementing change.

Dr. Atkins began this breakout session with an explanation of the VA's Quality Enhancement Research Initiative commonly referred to as QUERI. Created in 1998, the QUERI program is a research-based initiative focused on getting effective practices adopted and spread in the VA health care system that emphasizes (1) partner-responsive research, and (2) implementation science, a mission very much in line with the focus of this year's Trauma Spectrum Conference. QUERI researchers strive to improve health care in the VA system by studying and facilitating the adoption of evidence-based interventions into routine clinical practice, and their research is driven by the question of how to speed up, spread and sustain improvement in a complex health care system.

Dr. Atkins said that QUERI sees partner-responsive research as involving practitioners early in the process and as being more responsive than traditional research to review and funding. It also fosters relationships that are long-standing, and understands that its process must adapt to ongoing clinical practice and a constantly changing health care system. As Dr. Atkins stated that the system does not wait for us to tell it to change, it changes nonetheless, and it is QUERI's job to work with that change and influence it in a positive direction. With regard to the part of the QUERI mission to foster implementation science, Dr. Atkins stated that the QUERI model assumes there are generalizable principles that affect implementation, and that they work to define those principles by using theory to formulate and test hypotheses, organize observations and build explanatory models. The QUERI uses a six-step model to develop and research its programs. These steps involve: (1) identifying priority opportunities for improvement, (2) identifying effective practices for improving outcomes, (3) examining variations in practices, their sources and their relation to health outcomes, (4) identifying and testing interventions to improve the delivery of best practices, (5) evaluating the feasibility, adoption and impact of coordinated improvement programs and (6) evaluating the effects of improvement programs on veterans' health outcomes.

Dr. Atkins then summarized the five factors that QUERI has learned through its efforts that influence outcomes: (1) the intervention or defining the change to be implemented, (2) the "outer setting" or the systems and environment in which the process takes place (e.g., finances, patient needs, etc.), (3) the "inner

Thursday Afternoon Breakout Sessions

setting” or factors internal to the system in which the change occurs (e.g., leadership, resources, etc.), (4) the individuals involved or the people and their skills and characteristics that will have to change (e.g., knowledge, self-efficacy, roles, etc.) and (5) the process or how the change is to be phased in (e.g., plan, local buy-in, champions, etc.). Dr. Atkins then stated that the rest of the breakout session would be focusing on actual QUERI initiatives to show examples of the work they do.

Implementation Science

Implementing Population-Based Outreach Services to Re-Engage Veterans In Care

Amy M. Kilbourne, Ph.D., MPH, Associate Professor, VA Ann Arbor SMITREC & Center for Clinical Management Research, Department of Psychiatry, University of Michigan

- Using the QUERI model explained by Dr. Atkins in the first presentation of this breakout session, Dr. Kilbourne discussed how several agencies partnered to find gaps in VA treatment for veterans with serious mental illness (SMI), developed an intervention based on the best available research and examined the data on the effects of the program’s implementation.
- This led to a national initiative called “SMI Re-Engage” that used the positive aspects and made adaptations based on the lessons learned from the first initiative. The presentation provided a clear example of how QUERI can be used in promoting effective interventions.

Following Dr. Atkins talk about the structure of the VA’s QUERI initiative, Dr. Kilbourne presented data on an actual program that QUERI helped to implement. In partnership with the National Center for Homelessness among Veterans and other departments within the VA system, QUERI helped develop and research a vital VA program that assists veterans and reduces mortality and morbidity. First, QUERI assisted the collaborators in identifying a gap in the ability of the VA to care for veterans with SMI who had been in for care for at least two appointments but had not been in contact for over a year, a pattern of compliance that research has shown to have a poor outcome. They used algorithms to identify veterans with SMI from several VA national data sources and gathered lists of veterans who were sent to points of contact at 138 VA medical centers. The POCs contacted veterans and invited them to return to care and helped schedule appointments to aid in returning to care. The local facilities provided reports on success of contacting veterans and patient service use and follow-up data on outcome were provided for this effort by QUERI.

Upon examination, this initiative had excellent results. There was a high rate of successful outreach (3,315 of the 4,791 veterans—69 percent contacted), and of those reached, 2,375 (72 percent) had returned to VA care by 2009 and had a much lower rate of mortality than those who did not return to care (0.3 percent versus 3.9 percent). There were also challenges, and consistent with the QUERI model, they were able to identify them (e.g., patients not keeping their clinic appointments, poor communication with non-VA health care about VA services, inaccurate veteran contact information, etc.) so that they could be addressed in follow-on efforts.

Given these positive results, the Under Secretary for Health of the Veterans Health Administration signed the “SMI Re-Engage” directive authorizing the Office of Mental Health Services and the Serious Mental Illness Treatment Resource and Evaluation Center to replicate these outreach protocols on a larger scale and to include other mental health diagnoses (e.g., PTSD). Learning from the initial QUERI methodology, the program has made appropriate adjustments and implemented further successes. The initial findings on this follow-up program are that (1) the implementation of new staff members at local facilities (i.e., local recovery coordinators or LRCs) are a natural fit for this initiative and VA services in general, (2) veterans are grateful to be contacted and (3) there is an appropriate focus on health care.

Thursday Afternoon Breakout Sessions

Implementation Science

No Easy Handoff: From Research to Practice And Back Again

Mona Ritchie, MSW, VA Mental Health QUERI & Center for Mental Healthcare Outcomes Research, Central Arkansas Veterans Healthcare System, Department of Psychiatry, University of Arkansas for Medical Sciences

- Ms. Ritchie gave a presentation on the experience of using the QUERI model to bring a research-based treatment practice into frontline clinics in the VA system. She gave a history of the COVES evaluation study (cost and value of evidence-based solutions for depression) that explored ways of bringing treatment for depression into primary care settings.
- Based on the success of the COVES study, a further initiative was undertaken, the VA TIDES initiative (translating initiatives for depression into effective solutions). Ms. Ritchie discussed the successes and lessons learned of TIDES and offered solutions for future endeavors.

Ms. Ritchie began the talk by saying that the title is very descriptive – in her experience in outcome research, there are no easy handoffs between research and practice. To illustrate this, she used a case study of implementing a research-based methodology that had good support in the literature but had not been widely implemented. In 2001, QUERI funded the COVES evaluation that examined the effectiveness of the VA TIDES initiative, a quality-improvement intervention to enhance depression treatment in primary care – a known gap between research and practice. The COVES findings showed that the TIDES initiative was effective, but it also determined how to design future efforts to be even more effective. Some of these factors included: (1) making sure leadership is engaged and involved, (2) involving local site participants in the implementation to ensure buy-in and make sure it is customized to the local facility, (3) initial allocation of organizational resources and (4) preparatory work to ensure success.

In 2006, the VA requested clinical proposals to provide primary care-based mental health services, an initiative very much in line with TIDES. Veterans Integrated Service Network (VISN) 16 mental health leadership responded to this request and they developed an implementation strategy (informed by the COVES research findings) using both internal and external facilitators to increase collaboration between those working on the VISN 16 mental health product line and experts in implementation science. Again, the results were positive. In an eight-month period, the number of unique patients seen in VISN 16 per month increased from approximately 100 to 1,300, and the number of mental health consults per quarter decreased by almost 50 percent.

Again building on the success of this initiative, Ms. Ritchie described how her team is using these findings to improve outcomes and more effectively bridge the research-practice gap. The VA's Office of Mental Health Operations (OMHO) developed a program to provide assistance to sites that have not fully implemented the Uniform Mental Health Services Handbook. OMHO staff needed training in facilitating implementation of complex programs and practices. As would be expected, the initial roll out did not go as smoothly as was hoped. As a result, OMHO asked QUERI to provide training in the external/internal facilitation strategy that was used in TIDES and the 2006 VISN 16 initiative. This initiative is still underway, but initial results look positive.

In summary, Ms. Ritchie stated that implementation researchers can help change care by: (1) building partnerships with clinicians and managers at all levels, which leads to invitations to assist clinics that may benefit, (2) being flexible and open to new roles, (3) quickly responding to the customer's needs and (4) always keeping an eye open for research opportunities within the context of clinical initiatives.

Thursday Afternoon Breakout Sessions

TBI Treatment Update

Traumatic Brain Injury Care in the Armed Forces

Katherine Helmick, MS, RN, CNRN, CRNP, Deputy Director - Traumatic Brain Injury Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE)

- Ms. Helmick gave an overview of TBI across the continuum of care. Accomplishments in the care of TBI include advances in clinical guidance, cultural changes in the priority of identifying and treating TBI, increased educational opportunities about TBI, improvements in TBI surveillance, improved methodology for detecting TBI and creating significant partnerships between the Defense Department, the VA and academia.
- While many advances in the care of those suffering TBI have been made, more information is needed on how to treat those with comorbidities associated with TBI, identifying undetected TBI and fast-tracking promising treatments into clinical practice.

TBI is a signature injury for the new generation of service members and veterans, and the Defense Department and VA are taking action to treat this condition across the full continuum of care (see Figure 14).

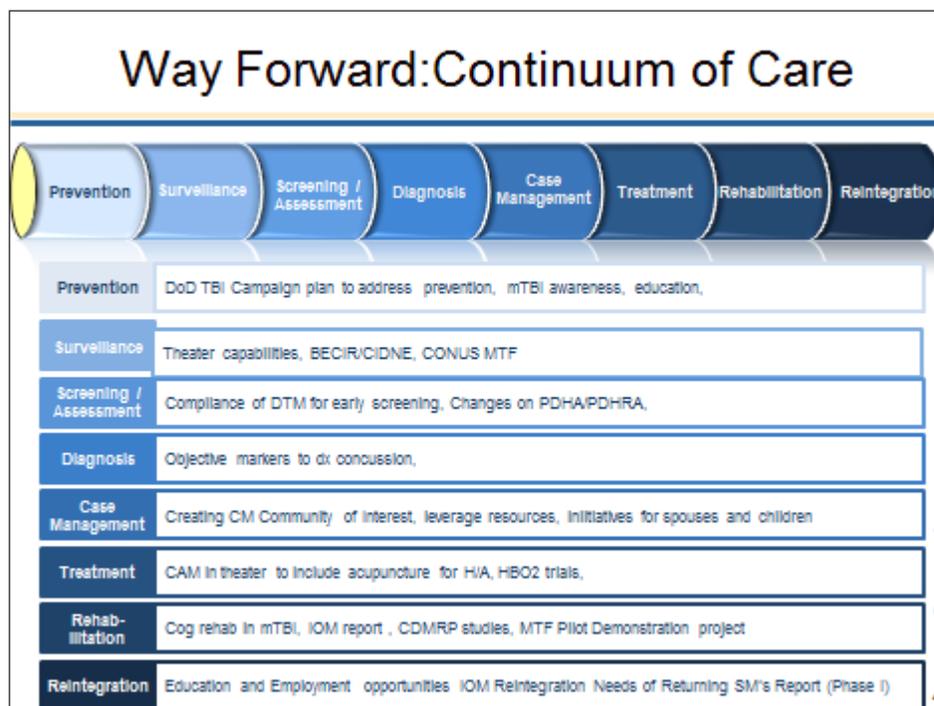


Figure 14. TBI treatment and the continuum of care.

Prevention efforts include the implementation of head-borne systems designed to improve protection (including helmets and headboards); requiring the use of seatbelts/personal protection equipment; and the launch of public awareness campaigns. Surveillance efforts include addressing and clarifying issues in the screening and diagnosis of TBI, an action that was also included in the revised ICD-9, which now includes severity categories. These surveillance efforts have indicated that mild TBI (mTBI) is its most prevalent form.

Thursday Afternoon Breakout Sessions

Screening and assessment policies have been improved and were greatly enhanced by the Directive-Type Memorandum (DTM) on the management of TBI, which developed specific protocols for the management of concussed service members. Importantly, this policy requires medical evaluation and a rest period for those who have sustained a TBI. The DTM also requires provision of standardized educational materials for these patients. In addition, the DTM introduced new protocols for those with three mTBIs or more in a one-year period, given the danger that multiple injuries carry and the dearth of literature on the effects of cumulative TBI.

Other screening efforts have been implemented to change the culture around TBI by earlier identification of incidents and improving documentation, training every warfighter to recognize the signs and symptoms of TBI, and improving the flow of data from theater to the Combined Information Data Network Exchange (CIDNE). Diagnosis of TBI is an active area of emerging science in search of objective markers of concussion. Some of these efforts include pupillary response/visual tracking measures, searching for biomarkers (blood serum, saliva, skin) of concussion, brain imaging (diffusion tensor imaging is one promising technology), as well as other electrophysiologic parameters such as event-related potentials and heart rate variability. Treatment of TBI has vastly improved and clinical practice guidelines have improved, particularly those for mild, severe and penetrating forms of TBI. However, clinical practice guidelines for moderate TBI still need to be developed. Clinical tools for TBI include the Military Acute Concussion Evaluation (MACE), guidelines for deployed warfighters, cognitive rehabilitation guidelines and a mild TBI pocket guide. More information is needed on how to best treat those with conditions co-occurring with TBI, such as chronic pain; substance use disorders; psychiatric illness and sleep; and vestibular, visual and cognitive disorders. Cognitive rehabilitation efforts attempt to address the domains affected by TBI, including attention, memory, social/emotional functioning and executive cognitive functioning.

In summary, many efforts and advances have been made to address TBI across the continuum of care in the armed forces. Significant efforts are being made to identify objective markers of TBI and to determine the best practice clinical guidelines for TBI and co-occurring disorders (see Figure 15). Challenges include identifying undetected TBI, addressing cultural barriers and fast-tracking promising treatments into routine clinical practice.



Figure 15. DoD research initiatives for TBI treatment and rehabilitation.

Thursday Afternoon Breakout Sessions

Women's Health Research

VA Women's Health Research

Kristen M. Mattocks, Ph.D., VA Connecticut Healthcare System Department of Internal Medicine, Yale University School of Medicine, West Haven, Connecticut

- Dr. Mattocks presented a history of women's involvement in the armed forces. Due to changes in policy and social trends, women are playing a much more central role in the military and they are the fastest growing segment of new enlistments.
- The Women Veterans Cohort Study has been funded and organized to investigate gender differences in VA health care usage, costs and outcomes, with special attention to the unique needs of woman veterans. The initial findings suggest that additional resources should be dedicated to this growing segment of the veteran population.

Historically, women have always participated in the military. However, the role of women in the Defense Department increased exponentially at the end of the Vietnam War when a two percent limit on female service members was lifted (see Figure 16). Over 300,000 women veterans used the VHA in 2010, which was a faster growth rate than men in the last ten years. The increase in female service members has inspired the Secretary of the VA to make improving women veterans' access to care a top priority. There is an increased demand for research to inform evidence-based practice and policy, and a large part of that is addressing the needs of women veterans.

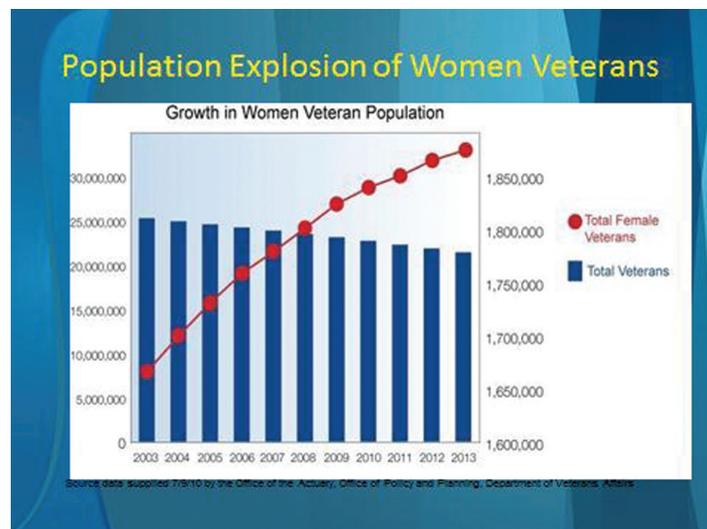


Figure 16. Chart showing the rising rate of women veterans.

Women now represent 15 percent of the active duty military, 20 percent of new recruits and 17 percent of the reserves and National Guard. This increase has also come with consequences, with close to 4 percent of Gulf War battlefield casualties being women and 71 percent reporting at least one combat exposure, a rate comparable to that reported by men. In the Defense Department, about 60 percent of women are under 45 and an increasing number of them are minority members (see Figure 17). As a result, women-specific

Thursday Afternoon Breakout Sessions

concerns (contraception, chronic diseases) need increased focus as women are more likely to visit primary care regularly and to seek mental health care than men.

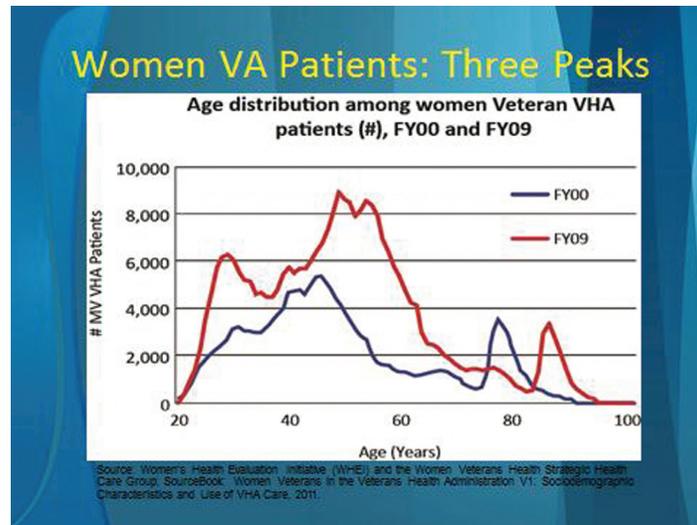


Figure 17. Chart showing the changing age distribution of woman veterans.

Deployment risk factors for women associated with combat that affect post-deployment medical conditions include (1) exposure to explosives (e.g., mortars, IEDs, etc.), (2) wearing heavy gear or ceramic vests, (3) extreme temperatures, (4) hygiene issues, (5) interactions with male counterparts and (6) family and other relationship issues. OEF/OIF women veterans are 20 times more likely to be diagnosed with musculoskeletal conditions and close to 75 percent of women receiving primary care report chronic pain. Mental health disorders include adjustment reaction, depressive disorders, PTSD and nondependent abuse of drugs. The results of screening measures in the VA indicate that 20 percent of women seeking health care report experiencing military sexual trauma.

The Women Veterans Cohort Study is attempting to address this issue and it aims to assess gender differences in health care costs, service use and health outcomes among 88,166 women OEF/OIF veterans enrolled in VA care. In a study of pregnancy and mental health among veterans, several mental health conditions were significantly higher in pregnant women, and a significant number of those pregnant women with a mental health condition had this diagnosis prior to pregnancy (see Figure 18). These findings make clear that the treatment of mental health conditions in women veterans during and after pregnancy is a major concern. In another analysis, researchers identified several post-deployment coping strategies in women, including some that are healthy (e.g., yoga and vet center activities) and some that are unhealthy (e.g., food binging/purging and compulsive shopping). The Women Veterans Cohort Study will continue its examination of health care cost, usage and outcomes and aim to increase the quality of care provided for our women veterans.

Thursday Afternoon Breakout Sessions

Mental health diagnoses among pregnant, and non-pregnant, Veterans in VA care

Diagnosis	All female veterans (n=40,112)	Pregnant veterans (n=2966)	p	% pregnant women with condition prior to pregnancy
Major depression	5%	12%	<.0001	61%
Mild depression	10%	24%	<.0001	62%
PTSD	9%	21%	<.0001	66%
Bipolar disorder	1%	3%	<.0001	55%
Schizophrenia	0.11%	0.33%	<.0001	44%
Any MH diagnoses	20%	32%	<.0001	22%
Substance abuse disorder	2%	5%	<.0001	56%

Figure 18. Data on mental health disorders in pregnant veterans.

Women's Health Research

Patterns of VA and Non-VA Care for Gender-Specific Conditions among Women Veterans Returning from Iraq and Afghanistan

Anne G. Sadler, R.N., Ph.D., Iowa City VA Health Care System

- Dr. Sadler outlined the pressing need for research to implement needed care for the increasing number of women veterans who will be receiving care at VA health care facilities.
- A description was given of the VA Women's Health Research Network, an initiative that includes a nationwide research consortium and a Practice-based Research Network (PBRN) that will work to partner with researchers to develop effective treatments.

Given the increasing number of women veterans using the VA, their significant comorbidities, and the limited women's health experience of some VA providers, the demand for evidence-based practice and policy in women's health is great. However, researchers are hampered by lack of local mentorship, technical assistance and collaborative opportunities, and difficulties recruiting sufficient sample sizes for single-site, let alone multi-site, studies.

To address this issue, Dr. Sadler reported that in 2010, the VA Health Services Research and Development Service funded the Women's Health Research Network, composed of a research consortium and a PBRN that brings together VA investigators with demonstrated interests in women's health research and investigators interested in adding women to their research.

Thursday Afternoon Breakout Sessions

On the consortium side of this initiative, Dr. Sadler stated that they are (1) developing education/training sessions in key content/methodological areas, (2) providing technical consultations, (3) enhancing communication networks, (4) developing a mentoring program and (5) fostering effective dissemination.

On the PBRN side, this initiative plans on developing infrastructure across partnered VA facilities to facilitate multi-site research, and will be used for three Implementation Evaluation Projects (IEPs): (1) gender-specific mental health service needs among women; (2) gender sensitivity training (providers and staff) and (3) a PBRN needs-assessment. PBRNs are defined as a collection of primary care practices that seek to evaluate the effectiveness of research-based practices performed in community practice settings (see Figure 19).

Dr. Sadler is confident that this infrastructure will help build research capacity in VA women's health research, help the VA better meet federal requirements for inclusion of women and substantially increase investigators' ability to translate current and emerging evidence into testable interventions for improving access, use and quality of care, which in turn will contribute to improved health and health care for women veterans.

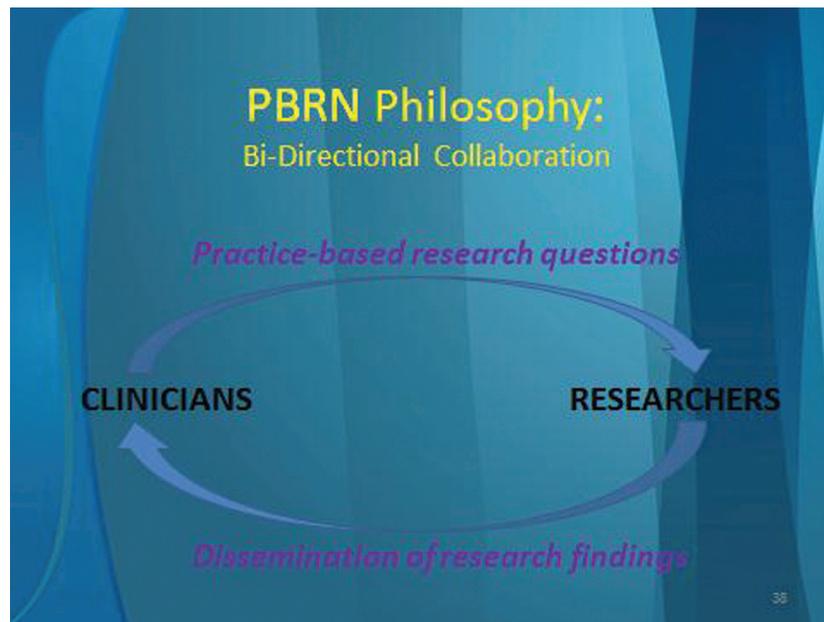


Figure 19. PBRN Philosophy for research implementation.

Numerous studies have come from the overall initiative by the VA to expand women's health research, including the following: (1) the Women at War Survey, (2) further development of the Deployment Risk & Resilience Inventory, (3) the post-deployment assessment of behavioral health barriers in OIF veterans, (4) Reintegration and Service Needs of Women Veteran Mothers, (5) Mild TBI/PTSD Comorbidity and Post-Deployment Outcomes in National Guard Soldiers, (6) Gender Differences in Mental Health Treatment Needs and Service Use, (7) Predicting Post-Deployment Mental Health Substance Abuse and Services Needs, (8) Urogenital Symptoms, Depression and PTSD in OEF/OIF Women Veterans, (9) Urinary Incontinence and Mental Health, (10) Stigma, Gender and Other Barriers to Care for OEF/OIF Veterans, (11) Community Re-Integration Problems and Treatment Preferences Among OEF/OIF Veterans, (12) Web-based Intervention: Participant Identified Barriers to VA mental health care, (13) Post-Deployment Mental Health Screening, and (14) Web-based Intervention: Improving access to VA Care, Health and Safety of Women in the Reserves, National Guard and Active Duty Military.

Thursday Afternoon Breakout Sessions

Dr. Sadler closed with a listing of the VA Health Services Research priorities, including improving post-deployment health outreach; coordination of care; recognition of unique injuries and problems, including the chronic care needs of this new generation of veterans; improving transitions between acute care, outpatient care and community needs; evaluating caregiver needs; treating chronic pain, PTSD, neurological disorders and TBI; rehabilitation (vision, hearing, mobility, neurological losses); military sexual trauma; treatment effectiveness/quality at veteran and system levels; emotional and cognitive recovery; community reintegration; and improving overall quality of life for veterans. The next steps in VA research are to translate qualitative research findings into improved programs and delivery models, synthesizing findings across research studies (validation, adaptation). Additional steps are to ensure that the findings from these studies are integrated properly into VA settings, and to conduct observational studies and clinical trials.

Co-occurring Disorders

Post-Deployment Co-occurring Disorders: Scope of The Problem & Treatment Approaches

Jay M. Uomoto, Ph.D., Deputy Director for Veterans Affairs, Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury and Miguel Roberts, Ph.D., Chief, Clinical Guidelines Division in the Psychological Health Clinical Standards of Care Directorate, Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury

- Drs. Uomoto and Roberts provided an overview of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury's Co-occurring Conditions Toolkit: Mild Traumatic Brain Injury and Psychological Health. They discussed numerous aspects of co-occurring conditions and how this innovative product can assist providers to care for wounded service members with them.

Polytrauma is defined as two or more injuries to physical regions or organ systems, one of which may be life-threatening, resulting in physical, cognitive, psychological or psychosocial impairment and functional disability. Polytrauma is becoming more common as military actions continue overseas. Existing treatment guidelines do not provide guidance on treatment of the interaction effects of polytrauma. The Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) has published the Co-occurring Conditions Toolkit: Mild Traumatic Brain Injury and Psychological Health. This toolkit addresses the interaction between persistent post-concussive symptoms (PPCS), posttraumatic stress disorder (PTSD), and chronic pain, which have overlapping symptoms. While treatment guidelines that address individual disorders and symptoms can still be useful in the polytrauma population, DCoE's toolkit provides guidance to providers for patients with multiple co-occurring conditions. The toolkit blends existing treatment protocols in a way that primary care providers and other clinicians will find practical. It is especially useful for the primary care provider who does not have access to team approaches to treatment. Multidisciplinary facilities (e.g., the National Intrepid Center of Excellence) incorporate neurology, primary care, mental/behavioral health and many other disciplines in an integrated approach. While this approach is ideal, it is often not feasible, especially for primary care providers in rural areas.

Neuropsychiatric symptoms that follow a traumatic brain injury can overlap with other conditions (headache being the most common and disruptive in daily function), making a definite etiology challenging. Rehabilitation should reflect these realities and take an integrative approach, involving the whole person and systems that revolve around that person. Removing excess disability (functional loss not accounted for by the disease process) requires prioritizing treatment to address the most debilitating symptoms first as well as pain management and patient education.

Thursday Afternoon Breakout Sessions

Since September 2001, over two million service members have deployed in support of OEF/OIF. Approximately 1.35 million veterans have left active duty and became eligible for VA health care since 2002. The demographics of OEF/OIF/OND veterans utilizing VA health care reflect a younger (mostly male/Army) population. Forty-five percent of those veterans come from Guard/reserve units. Mental disorders are the second most common diagnosis (51.7 percent), behind musculoskeletal disorders (55.7 percent). PTSD is the most common mental disorder, followed by depression. Higher rates of PTSD are seen in the veteran population as compared to active duty, implying that many service members seek treatment after discharge from military service. Higher rates are also seen in combat Reserve/Guard service members. The vast majority of OEF/OIF/OND veterans (96 percent) have been seen as outpatients only. In FY 2008, over \$900 million was allocated for psychological health and blast-related concussion expenses.

Friday Morning Breakout Sessions

Implementation Science

Tobacco Cessation for PTSD – Rationale and Strategies for Implementation

Miles McFall, Ph.D., Director of PTSD Treatment and Psychology Service, VA Puget Sound Health Care System; Professor, Department of Psychiatry and Behavioral Sciences, University of Washington, School of Medicine

- Although tobacco use has a negative impact on mental health outcomes, mental health treatment programs do not usually provide tobacco cessation services to their patients. In VA settings, treatment for nicotine dependence is provided separately from mental health treatment.
- Dr. McFall outlined a VA initiative that integrated PTSD and tobacco cessation treatment within the mental health service rather than providing smoking treatment independent of mental health care. The results were positive, with a greater rate of smoking reduction and cessation with no adverse effects on the effectiveness of PTSD treatment.

Tobacco is widely recognized as a leading cause of morbidity and mortality among users. In addition, tobacco use is high in those with a mental health condition, and smoking makes it harder to treat them because it exacerbates depression and increases feelings of anxiety and panic. Currently in VA health care settings, primary care providers (PCP) are the sole providers of smoking cessation treatment, but they are often not able to fully treat the disorder. The short, episodic appointments in primary care clinics do not address the needs of patients with this chronic recurring problem, and PCPs are usually not trained properly in behavioral health methods, leading them to consider cessation programs to be ineffective and not worth the effort.

One option researchers have considered is for mental health professionals to provide integrated mental health and smoking cessation treatment. This would allow for the ongoing, integrated treatment of both chronic conditions by someone trained in behavioral health and in a setting that will provide sufficient contact and monitoring. In addition, the integrated treatment of both conditions would allow the provider to address the dynamic relationship between the patient's mood and smoking behavior. Given this situation, a pilot study was undertaken to compare the VA usual standard of care (independent treatment of PTSD and nicotine dependence) to a brief integrated care (IC) treatment plan for nicotine-dependent veterans with PTSD, where veterans received cessation treatment integrated with the PTSD treatment over an extended time period. Patients in the IC group responded at the rate of 40 percent compared to 15 percent in the control group, after two months (see Figure 20).

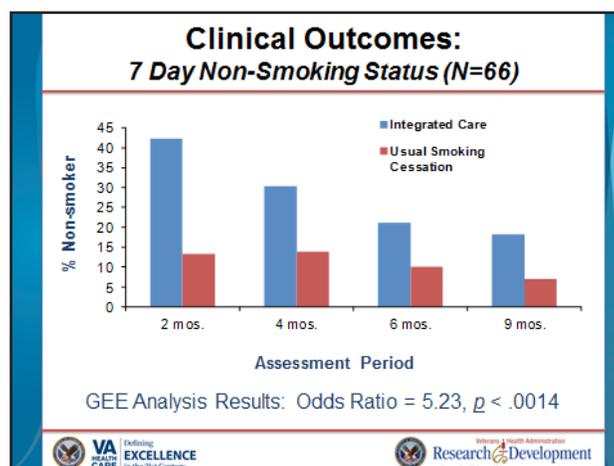


Figure 20. Data on an integrated PTSD tobacco-cessation treatment intervention.

Friday Morning Breakout Sessions

A second large-scale, multi-site randomized controlled trial (RCT) was then conducted at ten sites. The objective was to use prolonged abstinence as a measurement of the effectiveness of the IC approach, and to determine if cessation was associated with worse symptoms of PTSD or depression. Measurements were taken through self-reports and two biologically based tests capable of detecting recent tobacco smoking behavior. Twice as many veterans with PTSD enrolled in IC (8.9 percent) compared to those in standard care (4.5 percent) successfully quit smoking as indicated by biological samples collected over a seven-day prolonged abstinence. IC patients received an average of 8.8 sessions compared to 2.4 sessions for standard care patients. IC patients were more likely to use cessation medication than the standard care patients, and PTSD and depression did not worsen in those who stopped smoking. The IC veterans also had comparable reductions in PTSD symptoms, a positive finding since it was a concern that withdrawal effects may have worsened symptoms. A health economist determined there was no increase in the cost of care for IC over standard care.

Implementation Science

Translating Research Findings into Clinical Practice: Projects Underway, Lessons Learned, Future Plans

Andrew Saxon, M.D., VA Puget Sound Health Care System; Professor, Department of Psychiatry and Behavioral Sciences, University of Washington, School of Medicine

- Dr. Saxon followed the presentation of an evidence-based intervention for comorbid nicotine dependence and PTSD described by Dr. McFall. The Integrated Smoking Cessation Care for Veterans with PTSD Learning Collaborative was created to implement this kind of evidence-based treatment.
- The presentation focused on the factors involved in successful implementation of an evidence-based intervention, including longitudinal follow-up, two-way information flow and local clinic ownership of the intervention.

Following the presentation of an evidence-based treatment developed for integrated treatment for veterans with comorbid nicotine dependence and PTSD, Dr. Saxon described an attempt to implement interventions in existing VA clinics. Centered at the Duke Evidence-based Practice Implementation Center (Duke EPIC) of the Duke University Department of Psychiatry and Behavioral Sciences, he discussed the Integrated Smoking Cessation Care for Veterans with PTSD Learning Collaborative (ISCCLC) between the Veterans Health Administration Public Health Strategic Health Care Group, the VISN 6 Mental Illness Research, Education and Clinical Centers (MIRECCs) and the VA Sierra Pacific Network (VISN 21) National Center on PTSD. The ISCCLC was created to foster the successful implementation and sustained use of integrated smoking cessation care, an evidence-based intervention that incorporates smoking cessation treatment into mental health care for PTSD.

A learning collaborative is an adaptation of the Institute for Healthcare Improvement's Breakthrough Series developed to support delivery of effective health treatments in real world settings by bringing together multidisciplinary teams from different organizations to work together to accelerate the dissemination of effective practices. A learning collaborative focuses on engaging an entire service delivery system – management, supervisors and direct service providers, and integrates best practices in training and consultation with quality improvement methods to help organizations rapidly implement and sustain evidence-based practices. This learning collaborative is composed of seven VAMC/health systems with a total of 36 care sites, serving 1.2 million veterans residing in northern and central California, northern Nevada, Hawaii,

Friday Morning Breakout Sessions

the Philippines and several Pacific Islands, including Guam and American Samoa. The learning collaborative seeks to support VAMCs to make improvements in three key areas: (1) organizational support and capacity to implement integrated smoking cessation care; (2) clinical competence in delivering integrated smoking cessation care and (3) effective engagement of veterans with PTSD in smoking cessation treatment.

Sites that were interested in the IC program were solicited, and three separate face-to-face learning sessions were held with the EPIC teams. Providers at the selected sites were trained in the intervention's manual, which emphasized the use of tobacco cessation medications for those in treatment for PTSD using a train-the-trainer model. The intervention needs to be institutionalized to be effectively sustained, and a full, longitudinal dissemination plan was implemented that incorporated lessons learned from other mental health dissemination initiatives described in the literature (see Figure 21).

Learning Collaborative Model

- **Team-Based Training:** Participants trained in teams that include leadership and others integral to delivering the treatment.
- **Year-long Interactive Engagement:** Participants met face-to-face three times over the course of a year with opportunities for ongoing contact with faculty and other teams on calls and through SharePoint.
- **Use of Implementation Tools:** Participants utilized Collaborative Change Framework with specific goals and objectives, monthly improvement metrics, and PDSAs to support efforts to implement and sustain intervention.

VA HEALTH CARE | Defining EXCELLENCE in the 21st Century

Veterans Health Administration | Research & Development | Improving Veterans' Care | www.research.va.gov

Figure 21. Outline of Learning collaborative model used for tobacco-cessation research.

Dr. Saxon stated that ownership of the ISCCLC by local providers is essential to successful implementation. Although his team assisted with the local implementation, great efforts were made to not micro-manage the ISCCLC procedures. Allowing each clinic to have a choice, rather than mandating use of the IC, was another key to increasing motivation and maintaining investment in the IC program.

In closing, Dr. Saxon stated that smoking cessation is important to those with mental health diagnoses, as high rates of depression and nicotine dependence are related to suicide attempt rates, and he stated that it would be useful to expand the study to look at other psychiatric diagnoses besides PTSD.

Friday Morning Breakout Sessions

Cognitive Rehabilitation

Cognitive Rehabilitation: Review of the Research and Clinical Applications

Therese O'Neil-Pirozzi, Sc.D., Speech Language Pathologist, Northeastern University and Spaulding Rehabilitation Hospital, Boston, MA

- The gap between cognitive rehabilitation research and practice needs to be clarified and narrowed. The reciprocal relationship between the two areas is important and may be improved through collaboration, communication, and dissemination.
- The WHO-ICF Model of Disablement, which emphasizes activity and participation to support patient's ability to carry-out daily activities that are important to him/her is widely supported.

Cognitive rehabilitation therapy (CRT) has traditionally been approached from one of two perspectives: restoration, often emphasized in the early treatment phase, and compensation, often emphasized in the post-treatment phase. There are gaps in the literature on the long-term effects and specific recommendations for CRT treatment for traumatic brain injury. To date, there are several systematic reviews and meta-analyses of CRT, the most notable being those done by the Institutes of Medicine (2011), Cicerone et al (2000, 2005), and Rohling (2009). The Institutes of Medicine review is the latest and most comprehensive, and addresses many of the questions unanswered by the previous reviews. Their review supported the application of CRT in traumatic brain injury patients with objectively measurable, functional goals being tracked and CRT continuing for as long as gains are noted. They stated that studies of CRT demonstrate potentially meaningful benefits and warrant a comprehensive, multidisciplinary and collaborative research agenda to address issues of efficacy and effectiveness. However, they also concluded that there is currently an insufficient number of high-quality research studies to determine a concrete set of clinical guidelines, and gave strong recommendations for increased research of this treatment that has the potential to improve function for the numerous service members and veterans with TBI.

Dr. O'Neil-Pirozzi then discussed an outline of best practices that can be used in CRT for TBI. Following a TBI, cognitive impairments can result in activity and participation limitations. Consistent with the WHO-ICF model, CRT that facilitates the patient's participation in society (e.g., home, school, work, play, combat) should be the driving force for any CRT the patient receives (see Figure 22).

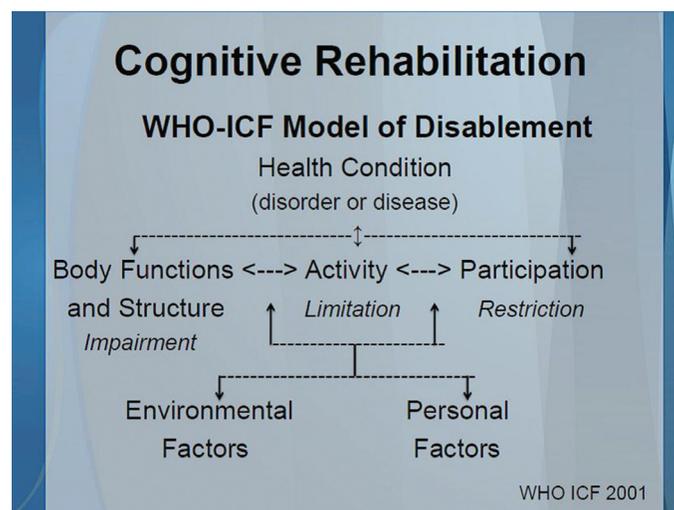


Figure 22. WHO-ICF cognitive rehabilitation model.

Friday Morning Breakout Sessions

These strategies should aim to minimize cognitive and problem-solving impairments and make environmental modifications to maximize the patient's ability to participate in activities. From a functional framework, Prigatano (1989) describes TBI-related impairments in terms of their effects on the patient's ability to engage in the areas of work, love and play. He uses these areas to facilitate recovery and establish patient goals for improvements in activity and participation across physical, psychosocial and cognitive-communication areas. Providers may work with patients and their families to target each of these areas through various methods and to address how they interact and impact each other.

Evidence-based treatments for attentional impairments include (1) computerized-hierarchical or (2) non-computerized attention-demanding tasks. For memory impairments, there is evidence to support the use of external (e.g., paper or PDA devices) and internal memory strategies (e.g., visual imagery). Examples of evidence-supported executive function and problem-solving training approaches include the Familiar Tasks as a Planning Template, Goal Management Training, Intense Goal Setting Participation and External Task-related Alerting Stimuli.

Dr. O'Neil-Pirozzi stated that the areas of neuroimaging, neuromodulation and neuroplasticity are the biggest gaps between research and clinical practice. Much of the ongoing research is challenging the traditional practice of CRT, and many questions remain. Neuroplasticity, defined as "...the ability of the brain to modify, strengthen, and create, as well as eliminate, synaptic connections in response to stimuli and life events" is especially relevant for the role of CRT providers in helping patients to un-learn maladaptive compensation strategies as well as to learn new, more effective strategies. This is important to think about developmentally and, in terms of traumatic brain injury and cognitive communication, can provide new directions for research in neuroplasticity.

Cognitive Rehabilitation

CogSMART Compensatory Cognitive Training

Elizabeth Twamley, Ph.D., Co-Chief of the Neuropsychology Unit of the Center for Excellence for Stress and Mental Health, VA San Diego

- Veterans with mild traumatic brain injury present with real-world cognitive problems, and valid psychological test results support this finding.
- We have learned from the treatment of psychiatric disorders affecting cognition, particularly schizophrenia, that if patients engage in a lot of restorative treatment without applying the skills to daily life, there is limited generalization to functional improvements.
- Cognitive symptom management and rehabilitation therapy (CogSMART) focuses on psychoeducation and skills-building for compensatory strategies across modifiable domains and involves individual and group treatment options as well as homework assignments.

Approximately 89 percent of returning veterans have sustained a mild traumatic brain injury (mTBI). Theoretically, they can expect a full recovery within one day to three months post-injury, although 10 percent or more may experience persistent cognitive symptoms. Clinically, veterans well beyond the expected period of recovery are experiencing persistent post-concussive symptoms as well as psychiatric conditions. In general, 40 percent have a history of PTSD or depression, and clinically, 60 to 70 percent of veterans are presenting with these diagnoses.

Several diagnostic issues related to TBI present challenges for assessment and treatment. The physical symptoms of TBI tend to resolve most quickly. However, the cognitive and psychiatric symptoms associated

Friday Morning Breakout Sessions

with TBI have an unclear path. Many psychological and cognitive problems are related to TBI, including sleep disturbances and substance use disorders and the respective etiologies are often unclear.

Treatment of mTBI often begins with assisting patients in managing their expectations and providing education about TBI symptoms and how they overlap with normal variations as well as other comorbid conditions. The Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) and Defense and Veterans Brain Injury Center (DVBIC) provide guidelines for TBI treatment. However, there is limited research with mTBI samples for the interventions included in these guidelines, and it may be difficult to know which cognitive rehabilitation therapy (CRT) to utilize for patients with mTBI.

CogSMART, a manualized intervention for mTBI, may be useful for a variety of clinicians working with patients with a range of impairments. In each session, veterans learn and practice strategies applicable to everyday life in one of four cognitive domains: prospective memory, attention/vigilance, learning/memory and cognitive flexibility/problem solving (i.e., executive functioning). Family members are involved in the first few weeks of the intervention to promote education and in the last two weeks to process changes and plan for the future.

Satisfaction ratings from patients engaging in CogSMART in the Cognitive Rehabilitation Clinic are positive and preliminary data from a Defense Department-funded research clinical trial underway indicates that participants engaging in CogSMART with supported employment are showing more improvement on post-concussive symptoms and letter fluency, and are trending toward improved depressive symptoms compared with those receiving supported employment alone. Future research initiatives include CogSMART combined with cognitive processing therapy (CPT) for veterans with mTBI and PTSD as well as the development of smartphone applications for TBI symptom management. Dr. Twamley would be glad to provide the CogSMART manual upon request via email at Elizabeth.Twamley@va.gov.

Substance Use Disorders

Co-occurring Substance Use Disorder, Post-traumatic Stress Disorder, and Mild Traumatic Brain Injury: Clinical Considerations

Lisa Najavits, PH.D., Professor, Boston University School of Medicine, VA Boston

- Dr. Najavits provided a background on the difficulties of treating comorbid substance use disorders (SUD), mTBI and PTSD, including difficulty in differentiating the underlying cause of similar symptoms and the lack of integrated treatment to address multiple symptoms. Unfortunately, there are few evidence-based treatments for the co-occurrence of these disorders.
- Seeking Safety was presented, an evidence-based treatment for comorbid SUD and PTSD. Seeking Safety is a flexible treatment that can be applied in numerous settings and to numerous populations. The principles of the treatment were outlined and an ongoing randomized clinical trial for comorbid SUD, mTBI and PTSD in military populations was discussed.

SUDs are one of the most common psychiatric diagnoses, with 14.6 percent lifetime prevalence in the United States, and the annual total societal cost of substance use disorders in the United States is an estimated \$510.8 billion. There is also a significant comorbidity with other psychiatric disorders, with a high overlap between SUDs, mTBI and PTSD. Of individuals in the general population, (a) 60 percent of those with a SUD, (b) 80 percent of those with PTSD and (c) 65 percent of those with mTBI have some form of comorbidity. Comorbid disorders complicate the individual treatment of each separate disorder, and with regard to SUD treatment, comorbid patients have worse treatment outcome, greater psychiatric, medical, legal and social

Friday Morning Breakout Sessions

problems, lower functioning, higher aggression and domestic violence, and greater substance craving in response to trauma/SUD cues.

Dr. Najavitis stated that the causal chain between SUD, mTBI and PTSD is complex, and there are numerous gaps in the literature on the pathology and treatment of them in comorbid patients. However, she pointed out several factors from the literature and from her clinical observations that are important to consider. For one, she stated that each of these disorders is a risk factor for the others. She also stated that she has noticed a tendency for SUDs to precede mTBI (citing research that shows that many with mTBI were intoxicated at the time of trauma), and for SUDs to follow PTSD. Dr. Najavitis concluded by saying that we need studies with patients who did not have a SUD prior to suffering a mTBI to understand the causal factors between the two disorders.

Assessment of comorbid SUD, mTBI and PTSD is also a complex process, given the common symptomatology of these conditions and other psychiatric disorders. Nonetheless, it is paramount when assessing and diagnosing comorbid patients to be aware of the tendency to misinterpret mTBI symptoms as indicators of poor response to SUD treatment, PTSD treatment or treatment compliance in general. Commonly, impulsivity caused by mTBI can be interpreted as mania, personality disorder, impulse control disorder or non-compliance with treatment. To counteract these tendencies, Dr. Najavitis suggested conducting a thorough SUD assessment first and look for other factors such as trauma experiences, head injuries and symptom presentation during “clean” times throughout the assessment.

With regard to treatment of these comorbid conditions, the research is nascent and there are significant gaps in the literature. A major reason for this is that existing RCTs for the three conditions alone usually exclude the other disorders. For example, 62 percent of RCTs on PTSD excluded SUD patients, both PTSD and SUD studies typically exclude cognitively impaired patients, and TBI studies often do not report rates of comorbidity. Currently, there are no EBTs for SUD and TBI. Concerning TBI alone, Dr. Najavitis mentioned research by one other Trauma Spectrum Conference presenter, John Corrigan, in which he compared skills-based treatment, contingency-based incentives treatment and motivational interviewing, and found that the skills-based and incentive-based treatments were more effective than motivational interviewing. Dr. Najavitis stated that the only evidence-based treatment for SUD and PTSD is Seeking Safety, a treatment model she developed seventeen years ago.

Seeking Safety can be delivered as either education-training or as treatment. She mentioned that delivering Seeking Safety as an education/training program is advisable in the military, where people are more resistant to recognizing that there is a problem. Seeking Safety is very flexible and can be tailored to different populations. Advantages of the model include that there are twenty-five topics that can be used interchangeably, it is easy to deliver and can be done at a relatively low cost when compared to other possible therapies, and it can be performed in a host of different settings by staff not officially trained in psychotherapeutic techniques. Dr. Najavitis stated that the delivery of Seeking Safety is a “no harm, no foul” situation and can cause no more iatrogenic effects than “taking a class in school.”

Seeking Safety is based on Herman’s work using three stages: (1) how do you establish safety and stabilization, (2) mourning the trauma and (3) reconnection. The treatment philosophy encompasses the following: (1) safety is paramount in all aspects of treatment, (2) dual focus on both PTSD and SUD, (3) the sessions focus on a specific set of ideals, (4) the content is primarily cognitive, behavioral and interpersonal, with attention paid to case management, (5) a paradoxical focus on both structure and flexibility, (6) the use of simple, human language and (7) there is close attention paid to clinician processes. Topics covered include Safety, Taking Back Your Power, Substance Abuse, Asking for Help, Detaching from Emotional

Friday Morning Breakout Sessions

Pain (Grounding), Taking Good Care of Yourself and Setting Boundaries in Relationships. Currently, there is a randomized clinical trial being conducted in a military setting investigating the use of Seeking Safety for treatment of comorbid SUD, mTBI and PTSD, with the goal of creating a treatment protocol for military populations. Dr. Najavitis stated that she thinks Seeking Safety would be an excellent therapy for adaptation to an internet-based therapy.

Substance Use Disorders

Substance Abuse in the Military: Highlights of NIDA Activities

James M. Bjork, Ph.D., Program Official, Clinical Neuroscience Branch, National Institute on Drug Abuse

- There is solid literature that suggests that service members and veterans are adversely affected by alcohol and drug use. Based on this fact, the National Institute on Drug Abuse conducted a workshop in January 2009 to allow subject matter experts to identify areas in need of research, explore the use of existing evidence-based treatments (EBT) in military settings and suggest future research areas.
- This workgroup identified factors unique to military culture that need to be taken into consideration when conducting research on active duty populations, including a lack of confidentiality and a zero-tolerance policy. In addition, Dr. Bjork mentioned several recommended research initiatives, including the study of comorbidity and the use of technology to improve treatment outcomes.

Dr. Bjork stated that the National Institute on Drug Abuse (NIDA) objectives are to fund research that helps characterize, prevent or treat SUDs through monitoring and characterizing drug use patterns, examining the causes and effects of drug use and evaluating and developing prevention and treatment programs. Given that research shows that SUDs adversely impact service members and veterans, NIDA conducted a workshop on Jan. 6-7, 2009, entitled, "Addressing Substance Abuse and Comorbidities Among Military Personnel, Veterans, and their Families: A Research Agenda." The workshop brought together subject matter experts from the Defense Department, the VA, the U.S. Army Medical Research and Materiel Command, Department of Defense Health Affairs, Army Center for Substance Abuse Programs, and numerous NIH Institutes (i.e., NIDA, the National Institute of Mental Health, the National Institute on Alcohol Abuse and Alcoholism, the National Heart, Lung, and Blood Institute, the National Cancer Institute) to help identify cross-agency expertise on substance abuse and comorbid problems and harness joint expertise to move the science forward to help our troops, returning veterans and their families with effective interventions. The workshop worked to clarify the state of knowledge on incidence, prevalence, causes and consequences of deployment-related SUD problems, assess the available prevention and treatment evidence-based interventions (EBIs) and the evidence supporting them, discuss the potential for adapting existing interventions for military and veteran populations and their families, investigate issues related to conducting research with these populations and formulate a research agenda.

An important outcome of this workshop's analysis highlighted the complexities of treating SUDs in the military. Along with the known problems related to problematic substance use, the problems are compounded by (1) a zero-tolerance policy regarding illicit drug use, (2) possibility of discharge as a consequence of obtaining treatment, (3) lack of confidentiality in treatment records, (4) SUD's impact on the ability to obtain a security clearance and (5) the stigma associated with SUD and mental health treatment. In addition, research is hampered by an intolerant military climate toward illicit drug use, lack of human subject protection, barriers to gaining access to military populations and their families and institutional barriers to collaborative research between NIH and the Defense Department.

Friday Morning Breakout Sessions

The workshop also developed specific research goals. With regard to military personnel and veterans, they recommended studies that better characterize incidence and prevalence of drug abuse/mental health disorders across the deployment cycle, identify those at increased risk for SUD and mental health problems, increase understanding of the reciprocal roles between SUD and mental health disorders, assess the relationships between comorbid pain, prescription drug use and mental health disorders, assess readiness for deployment and examine stigma related to treatments for SUD and mental health. With regard to families, they recommended research that assesses the impact of deployment on families, examining family-related risk and protective factors, and the roles of stress and coping strategies.

After conducting a gap analysis of the literature, the workshop recommended mining data from existing epidemiologic surveys to assess SUD and mental health problems, expanding data collection on illicit and prescription drug misuse, obtaining epidemiologic data on issues facing the children and family members of military personnel and implementing longitudinal studies of deployment and trajectories of children and families over time. In offering recommendations for research on treatment, they suggested examining the adaptation of EBTs for SUDs in civilian populations for use in military personnel and veterans, developing treatments for comorbidity (e.g., TBI, prescription drugs, pain, anxiety), exploring underlying self-medication issues, examining the timing and sequencing of treatment interventions and researching the dissemination of PTSD and chronic pain treatments to physicians and other providers. Overall, this initiative resulted in over six million dollars that funded fourteen different grants for researchers from NIDA, NIAAA, NCI and VA.

In closing, Dr. Bjork mentioned how NIDA researchers are using technology to bring innovative and novel treatments to service members and veterans. There is a smartphone app to help veterans fight PTSD called “iHeal.” This app monitors the individual’s physiology through a sensor worn on the wrist or ankle. When there are changes in body cues that might indicate an intensification of distress related to SUD or PTSD, it immediately “calls up” the vet and asks for information about how the user is feeling, what he is craving, where he is going, etc. The veteran application uses geo-positioning information to detect problematic areas (e.g., a liquor store or drug neighborhood) and poses questions that discourage substance use.

T2 Technology Interactive Workshop

Mobile Apps and Tele-mental Health Treatment/Integration of Technology in Psychological Health and Traumatic Brain Injury Care

Karl O. Moe, Ph.D., Chief of Staff, National Center for Telehealth and Technology (T2); Elspeth Fast, M.S.W., LICSW, Washington, D.C. VAMC; Leslie Morland, Psy.D., National Center for PTSD, Pacific Islands Division, Dept. of Veterans Affairs Honolulu.; Bridget Ruiz, M.Ed., University of Arizona, and The Substance Abuse and Mental Health Services Administration (SAMHSA)

- This breakout session was a combination of presentations and small group demonstrations of smartphone/tablet applications, or “apps,” developed collaboratively by the National Center for Telehealth and Technology (T2) and the VA. The goal of the breakout session was to inform participants on the role that technology can play in psychological health and TBI care and how it can be integrated into the current treatment system.
- The technologies reviewed included websites, smartphone and “virtual worlds” applications and computer-based, self-directed interventions for behavioral health problems.

Dr. Moe opened the session with an overview of the challenges and opportunities associated with integrating technology into current systems of care. One of the greatest challenges that these new technologies can

Friday Morning Breakout Sessions

address is the difficulty the current system has in providing behavioral health treatments in a timely manner. Regardless of the recent increase in the number of providers, the VA and the Defense Department cannot provide treatment for all those who may require it given the challenges posed by timing and distance. He cited the fact that in 2004, over half of the service members with diagnosable problems did not seek treatment due in part to stigma, the hours that treatment was available, and distance from clinics. Of those who sought treatment, only one-third actually received help.

Dr. Moe stated that the use of technology is important because it (1) is anonymous, safe and less impacted by stigma, (2) is easily and immediately accessible compared to waiting for a clinic appointment, and (3) provides the level of care needed with personalized solutions. In addition, it is a great help to providers and health care systems because it acts as a “force multiplier” for stretched systems and allows non-specialty providers access to behavioral health tools and real-time data that can be tracked longitudinally. The remainder of the breakout session provided information on how technology is being used across the continuum of care for education, skill building, assessment, treatment and follow-up monitoring.

Dr. Moe stated that the most commonly used technologies are self-help and provider assisted websites and mobile applications. He provided a demonstration of the capabilities of the afterdeployment.org website that was designed as an initial self-help tool for service members and their families. It offers resources, including tools to foster resilience in preparation for deployment/redeployment/reintegration and can be used anonymously. Since 2008, modules for 18 separate topics related to fostering resilience have been added to the afterdeployment.org website, and modules on pain, finance, and suicide will be added in the next year. Each topic area offers assessments, workshops and associated resources. There is also a provider portal to assist clinicians.

Elspeth Fast, a provider at the Washington, D.C. VAMC, has taken the afterdeployment.org website and created a novel treatment that is effective with veterans from the recent conflicts. She and a colleague developed a drop-in program for returning veterans who were open to services, but (1) did not meet diagnostic criteria for PTSD, (2) did not want to be identified as needing treatment, (3) needed immediate attention or (4) needed support outside of normal business hours. The drop-in groups are held three times a week for an hour and participants can decide what topic they want to cover. To facilitate self-study by drop-in group members, the facilitators make sure group members have a log-in and password to access the site at home, and homework suggestions are offered. They are also introduced to the website’s peer-to-peer chat function to reduce isolation and promote a sense of community. Ms. Fast cited research that supports use of online resources and suggested that its use has great potential to improve PTSD and TBI care. It is a flexible tool, and she stated that it could be used in primary care clinics, community centers as an outreach, university campuses, and other places where veterans may find it of use.

Dr. Moe then discussed the MilitaryKidsConnect (MKC) website that has the motto “kids deploy too.” MKC provides deployment related information for children in the three age groups of tots, tweens and teens, and is designed to give developmentally appropriate content. In addition it provides resources for parent/guardians and educators. He navigated through the website as a part of this presentation, giving a demonstration of the website’s landing page, an animated global guide, introductory videos, games for building resilience skills, and a peer-to-peer social networking feature that is safe, monitored and age appropriate.

Dr. Leslie Morland then gave a presentation on clinical video tele-mental health (VTMH), and its use in the Defense Department and the VA. Facing increased challenges of serving rural veterans and reserve service members, the Defense Department and the VHA/National Center for PTSD are investigating VTMH and future directions for its use. Since 2005, there has been a dramatic increase in providing services through VTMH

Friday Morning Breakout Sessions

and this effort is a Defense Department and VA priority. The Defense Department and the VA are working to provide increased levels of remote, VTMH access to at least two forms of evidence based treatment for PTSD: cognitive processing therapy and prolonged exposure.

Although the ultimate question is whether VTMH is as effective as traditional face to face therapy, the research on VTMH is also concerned with clinical factors, treatment fidelity, therapeutic process and cost outcomes. Dr. Morland noted that both her research and the general literature suggest that VTMH is effective in delivering evidence-based treatment remotely. Two VTMH studies using remote delivery of cognitive processing therapy (CPT) are currently underway, and there are plans for future research developments of VTMH. The final speaker for the afternoon session was Bridget Ruiz from the University of Arizona who presented on technology initiatives currently underway at the Substance Abuse and Mental Health Services Administration (SAMHSA) for an adolescent population with a comorbid traumatic brain injury and substance use disorder diagnosis. Ms. Ruiz described a variety of projects, including (1) a podcast using scripts for use as homework or in session illustrating problem-solving approaches, (2) a smartphone app offering information and quick access to local resources for adolescents and their case managers, (3) a multi-site project that addresses recovery support for adolescents leaving treatment with telephone support from trained staff, and (4) a secure social networking site (Recover Together) for teens in recovery. She also mentioned a smartphone app developed at the University of Wisconsin with GPS that will text the user when approaching negative behavior triggering locations/activities. Ms. Ruiz concluded by stating that there are several studies that show youth are using treatment-based websites and mobile apps at a good rate with positive results.

This demonstration ended with small group hands-on demonstrations of several mobile applications on two platforms using various handheld devices. These included the mTBI pocket guide, T2 MoodTracker, T2 Breathe2Relax and PE Coach. The session ended with a presentation of the Virtual Worlds' avatar based T2 Clinic and a demonstration of how the site is designed to be used.

Implementation of Wellness Strategies

Implementation and Wellness Strategies: Using the Total Force Fitness Framework in Case Conceptualization and Treatment Planning

Mark Bates, B.A., Ph.D., Director, Resilience and Prevention (R&P), Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE), and Colanda Cato, Ph.D., Subject Matter Expert, DCoE.

- Presenters identified gaps between evidence and practice in treating service members, and then showed how the Total Force Fitness (TFF) and the Military Demand Resource Model (MDRM) are addressing those gaps and developing stronger and more resilient service members by addressing all aspects of their lives beyond those normally addressed in behavioral health treatment.
- Drs. Bates and Cato then used a case conceptualization model with TFF and the MDRM to show how this holistic treatment paradigm creates a stronger and more resilient military. They gave examples and demonstrated simple mind-body interventions that can be used with service members to enhance total force fitness outcomes.

The high operational tempo and multiple/extended deployments associated with the recent conflicts in Iraq and Afghanistan are a unique situation and have placed inordinate stress on service members and their families. To address this, in 2010, the Chairman of the Joint Chiefs of Staff endorsed the TFF initiative, an integrative approach to overall service member functioning that incorporates many of the prevention and resilience interventions that behavioral health researchers have long known to be helpful. Going beyond the

Friday Morning Breakout Sessions

standard bio-psycho-social framework of treating the individual, TFF gives greater specificity to evidence-based interventions that will allow service members to remain strong and resourceful during intense operational demands. An added advantage of the TFF model is that it uses a framework and language that is appropriate for military audiences when standard language used in mental health might be off-putting to a hardened warfighter.

In developing the TFF model, the subject matter experts developed a heuristic model to understand how individuals and organizations in the military respond to stress. After examining all of the evidence-based models of organizational response to stress, they developed the MDRM, which can be understood from within the psychological TFF domain (see Figure 23).

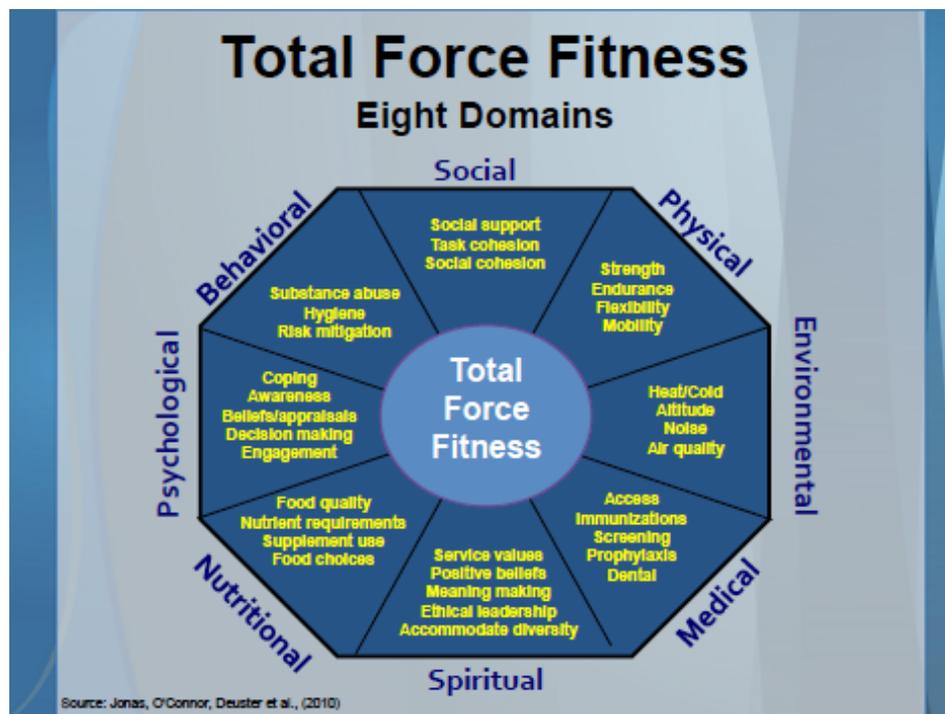


Figure 23. Total Force Fitness Domains.

The model shows how individuals or organizations use internal and external resources to deal with tasks and challenges. The internal resources for the MDRM are (1) awareness and attention, (2) beliefs and appraisals, (3) coping, (4) decision making and (5) engagement; the external resources are (1) leadership, (2) unit support, (3) training, policy and research, (4) programs and services and (5) culture.

Dr. Bates pointed out that there is a dearth of evidence-based studies on resilience, due to the difficulty in measuring the construct, a factor that has hindered the introduction of prevention and resilience programs in the military. However, TFF and MDRM have the advantage of being able to be more accurately measured, as there are numerous valid psychological measures that can assess the internal resources, making it an excellent framework for assessing soldier strengths and resilience.

Friday Morning Breakout Sessions

Dr. Cato provided case examples of how to assess service members who were in need of assistance using the TFF and MDRM. Providing real life situations, Dr. Cato showed how the issues facing service members can be easily broken down with TFF and MDRM, and then showed how existing technologies developed by DCoE and the National Center for Telehealth and Technology can be used to develop resilience. Finally, the breakout session attendees were invited to take part in some of the relaxation exercises that they can subsequently practice on service members.

PTSD Treatment Updates

PTSD Therapies with Ongoing Research Updates

Ronald Hoover, Ph.D., Senior Scientist, United States Army Military Operational Medicine Research Program

- PTSD represents a significant threat to warfighter health, performance, and fitness, as 11 percent of medical evacuations are due to behavioral health, 15-20 percent of post-deployed warfighters screen positive for PTSD, and veterans have poorer response to treatment than other trauma survivors.
- The Military Occupational Model of PTSD recognizes the unique influences of military employment on the etiology and treatment of PTSD, including the command structure and how it influences reactions to trauma.

The U.S. Army Medical Research and Materiel Command Military Operational Medicine Research Program attempts to develop countermeasures and knowledge products, specifically seeking to: develop effective medical countermeasures against combat and operational stressors; maximize warfighter health, performance and fitness; and foster, fund and develop research programs by conducting both intramural and extramural research. The joint capability gaps in psychological health that this program seeks to fill are to ensure the mental health of warfighters and to restore the health and fitness of casualties. PTSD represents a significant threat, as 11 percent of medical evacuations are due to behavioral health, 15-20 percent of post-deployed screen positive for PTSD and veterans have poorer response to treatment than other trauma survivors (perhaps due to more severe and chronic PTSD symptoms that may be less apt to remit). Furthermore, stigma impedes care-seeking, current evidence-based therapies are less than 50 percent effective and do not address comorbidities, and FDA research may not involve veterans, and there is insufficient clinical practice monitoring and ensuring use of EBTs. The Military Occupational Model of PTSD was developed to address the unique aspects of PTSD for military personnel. This model recognizes the different origins, expectations and reactions to traumatic events that military members experience when compared to civilian populations (see Figure 24). The Military Occupational Model also recognizes the influence of the command structure and how it can affect the expression of PTSD.

Friday Morning Breakout Sessions

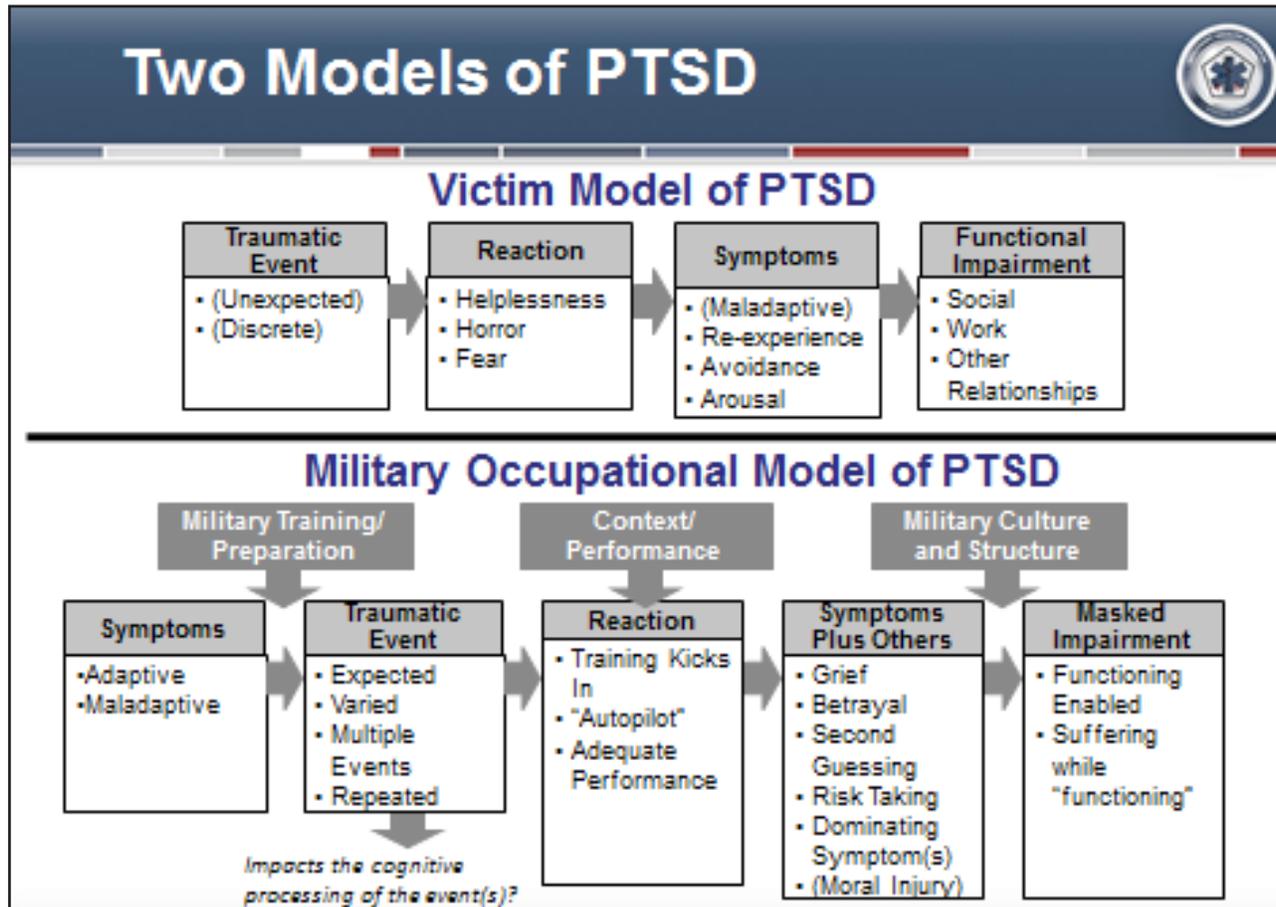


Figure 24. Diagram illustrating Military Occupational Model of PTSD.

The Military Operational Medicine Research Program's current assessment of PTSD capabilities is that basic science and neurobiological mechanisms of PTSD are being well addressed, but more efforts are needed to address prevention, early intervention, assessment, and treatment of PTSD. The assessment also noted that research efforts investigating recovery/return to duty of service members and veterans with PTSD are poor (partially because some of this research falls under the purview of the VA). Current research involves a number of medications, psychotherapies and complementary and alternative interventions. Medications that have shown promising results in early research studies include prazosin, propranolol, D-cycloserine and nopicastat. There are many active PTSD drug development efforts, and medications to improve sleep are of particular interest due to the importance of sleep disorders for many service members. Research on improving PTSD psychotherapies primarily seeks to optimize existing empirically supported treatments by testing different combinations of treatments. For example, massed (daily) versus spaced (weekly) delivery of prolonged exposure (PE), testing individuals versus couples delivered PE and combining promising medications as adjuvants to PE are being studied. Other psychotherapy research efforts are examining the delivery of psychotherapy in different locations. Tele-medicine-type delivery of intervention, in-home delivery, and many computer-based interventions (e.g., self-administered, peer based, therapist supervised) are all being investigated. Virtual reality-enhanced therapy may be a powerful way to treat PTSD as it can be customized to fit each warfighters description of their trauma with multi-modal stimuli such as auditory, visual and tactile.

Friday Morning Breakout Sessions

Additional challenges in treating PTSD are addressing comorbidities such as depression, substance use, sleep disturbances, suicidality, violence and intimate partner violence. Studies show that 75 percent of PTSD sufferers whose trauma includes either abuse or violent trauma are also diagnosed with alcohol problems, and 33 percent of those whose trauma is the result of accidents, illness or disaster have ongoing increased risk for health problems and chronic pain. Broadening participant inclusion in research studies that investigate comorbidities and reflect real world PTSD symptomatology are needed to address these issues.

Decision Sciences

Shared Decision Making: Improving Care By Incorporating Patient Preferences Into Treatment Decisions

Nananda Col, M.D., MPP, MPH, FACP, University of New England, Maine

- Dr. Col outlined the shared decision making model that is designed to allow patients an opportunity to be appropriately involved in determining their treatment plan. This model has been shown to increase patient participation in treatment and empower them to be proactive in addressing their health care needs.
- Factors related to the application of this model were addressed, including the change in patient provider relationship, the use of this model by drug-seeking patients, and patient insistence on using faddish, unproven treatments.

Shared decision making is defined as having all stakeholders of a decision participating in the decision-making process. It implies that all parties are informed about the subject and viable alternatives are known and considered. In the relationship between provider and patient, shared decision making involves incorporating patient preferences into the treatment plan and educating patients about advantages and disadvantages of alternative treatments. Shared decision making has been shown to have several benefits, including (1) better patient outcomes, (2) more satisfied patients, (3) lower provider liability, (4) more realistic patient expectations, (5) less surgery and medical tests and (6) more knowledgeable patients.

Shared decision making is not very common. Research shows that approximately 10 percent of surgeons and 8 percent of primary care physicians make a concerted effort to use shared decision making. Like any treatment modality, shared decision making is not appropriate for all situations or patients. However, by adding this tool to the arsenal, a clinician can improve a patient's health care experience and improve the chance of treatment compliance and favorable outcomes, all while decreasing strain on the health care system. It is appropriate when there is more than one reasonable treatment option because frequently there is uncertainty about the most appropriate treatment, patients' treatment choices may vary depending on their values and when it is possible to delay treatment decisions to allow the patient time to deliberate.

However, it is important to note that there are barriers to implementing shared decision making. Among them are that clinicians are concerned about the time involved, lack training in sharing responsibility for treatment decisions with patients and are not confident that a patient has the ability to play an active role in treatment planning or that a particular situation is appropriate for shared decision making. Unrealistic patient demands can also impede or prevent shared decision making because they can lead to inappropriate use of medications that have the potential for abuse or addiction and use of ineffective treatment protocols.

While most patients want an active role in deciding their care, some are uncomfortable, thinking that "the doctor knows best." Others may not be cognitively capable of weighing options and synthesizing information.

Friday Morning Breakout Sessions

It is important to screen patients for their desired level of involvement in decision making and explain that patient input matters and will likely lead to a more palatable treatment.

Pain Panel

Acute Pain Management Task Force Downrange Pain Control

Col. Chester Buckenmaier, USA, M.D., Program Director, Defense and Veterans Center for Integrated Pain Management

- Battlefield pain management has not seen significant innovations beyond providing morphine-based pain medications, and the inadequate treatment of pain during the acute phase can lead to long-term chronic pain.
- The Acute Pain Medicine Service was created to bridge the gap between the empirically validated techniques available and actual downrange medical operations. This model involves staffing suggestions, ongoing research as to its effectiveness, education for providers and advocacy within the system.

Until very recently, acute battlefield pain management did not involve much more than dosing morphine, a technique that has been in use since the Civil War. With the support of Army MEDCOM leadership, including its former Commander, Lt. Gen. Eric B. Schoomaker, a Pain Management Task Force was chartered in 2009 that was tasked to improve acute, downrange pain management and "...provide recommendations for a MEDCOM comprehensive pain management strategy that is holistic, multidisciplinary, and multimodal in its approach, utilizes state of the art/science modalities and technologies, and provides optimal quality of life for Soldiers and other patients with acute and chronic pain." This task force has developed a new model of treatment called the Acute Pain Medicine Service that can be incorporated into existing treatment structures, a clinical practice guideline, a charting system that carries critical information for pain management between facilities, a standardized pain rating scale, a textbook on the latest evidence-based practices, staffing recommendations and suggested steps to standardize these improvements in MEDCOM.

Research shows that the treatment of acute pain has lasting effects on the development of subsequent chronic pain through the process of neuroplasticity. The brain responds structurally and functionally to environmental conditions and exposures such that neural networks and their dysfunction can be manipulated experimentally and by specific treatment procedures. If pain is not treated properly in the initial stages, the pain sensations (neurogenic inflammation) can lead to an increased sensitivity to pain stimuli (i.e., peripheral sensitization). This leads to a broader lowering of the pain threshold (central sensitization) and soon leads to the pathophysiology and psychopathology of a chronic pain condition with negative medical, psychological and social consequences.

Col. Buckenmaier discussed some of the innovations that have been implemented in theater at a Role 3 multinational medical unit called the Acute Pain Medicine Service as well as data on its effectiveness. Over 40 percent of all patients at the Role 3 facility were treated by the Acute Pain Medicine Service, which represented the majority of the patients who were not in intensive care or seen for light injuries. Innovative pain techniques were used such as ultrasound to locate probable sources of pain combined with targeted anesthetics (e.g., catheters, single blocks, Bolus, etc.) that significantly improved pain outcomes. The average pain score (0-10) of patients entering the service was 5.3, and within 24 hours the average pain score was 0.7. Evaluation of staff opinion of the Acute Pain Medicine Service revealed that providers overwhelmingly thought that it had a significantly positive effect on patient outcomes. In addition, they were able to airlift patients to more advanced facilities with less pain and distress, which improved outcomes on arrival.

Friday Morning Breakout Sessions

This initiative also includes a proposed staffing for Role 3 facilities to include a medical officer (probably a military-trained anesthesiologist), a chief nurse and a ward pain nurse champion. These personnel can be a part of the existing Role 3 force structure, reducing the resources needed for implementation. There is a handbook available online (i.e., the Military Advanced Regional Anesthesia and Analgesia [MARAA] Handbook, dvpmi.org) to assist providers in selecting the most appropriate way to treat acute pain at Role 3 facilities. The Theater Medical Data Store (TMDS), arapmi.org/TMDS-Guide.pdf, is available to military users to view and track ill or injured patients as they move through the theater levels of care (see Figure 25).

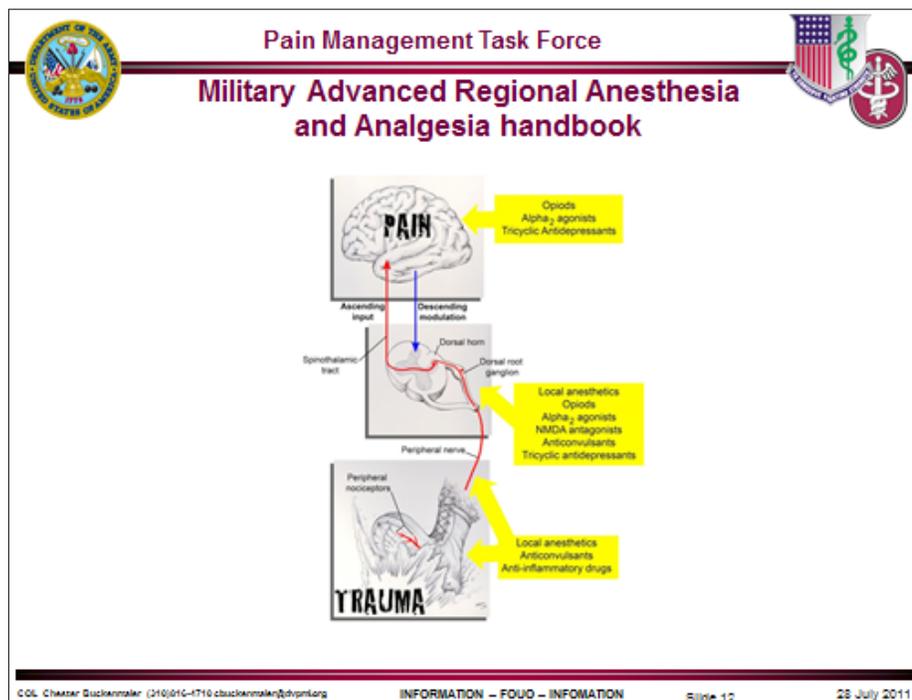


Figure 25. Outline of Level 3 facility pain treatment model in the Military Advanced Regional Anesthesia and Analgesia (MAARA) Handbook.

This innovation of acute pain management is a novel blend of research-based findings and pressing clinical need, and the data support its effectiveness and provider satisfaction with its incorporation into Role 3 treatment facilities. However, there are still systemic obstacles to its implementation. The task force will continue to advocate for this model by encouraging leadership to use the clinical practice guidelines, encourage the use of the TMDS, standardize pain measurement across the continuum of care and improve acute pain education for all providers.

Friday Morning Breakout Sessions

Pain Panel

Battlefield to Bedside and Back Home: Research along the Continuum of Pain Care in the Military and Veterans Health Systems

Rollin M. Gallagher, M.D., MPH, Deputy National Program Director for Pain Management, Veterans Health Administration; Clinical Professor of Psychiatry and Anesthesiology, Director of Pain Policy and Primary Care Research, Penn Pain Medicine, University of Pennsylvania

- Pain treatment and chronic pain are considerable problems for both civilian and military patient populations. In addition, coordinating treatment for chronic pain is difficult, given that it encompasses so many patient factors and can lead to behavioral instability.
- A stepped care model of treating chronic pain was proposed that encourages a judicious use of medical expertise and also coordinates behavioral and medical treatments as appropriate. This model enables primary care providers to treat a greater number of complicated pain patients with confidence.

Chronic pain is a public health problem, affecting 116 million people in the United States and societal costs of \$560-\$635 billion annually. Importantly, it is a factor for numerous veterans returning from OEF/OIF, with over 50 percent reporting to VA medical facilities complaining of musculoskeletal pain and a high rate of comorbidity (see Figure 26).

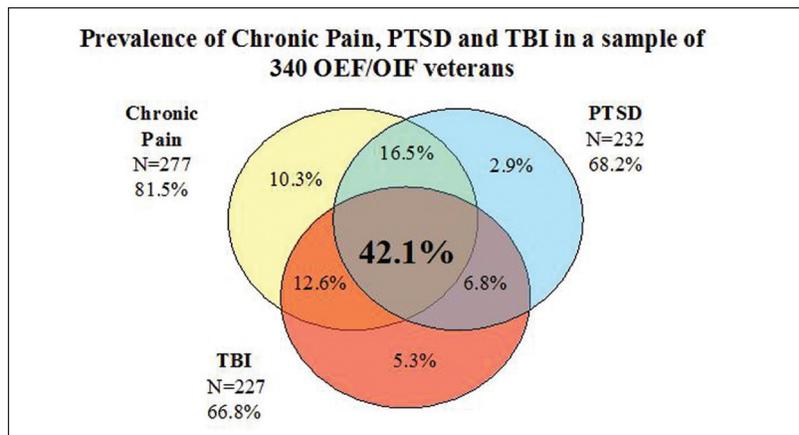


Figure 26. Percentages of comorbidity in returning OEF/OIF veterans (Lew et al., 2009).

An added difficulty for the treatment of these veterans is the transition from intensive and specialized military care to the community and/or veteran's health care system. The current models of care have difficulty treating veterans with pain due to a lack of knowledge of pain treatment in most medical settings, and either insufficient funding or insufficient organizational structure to handle complex pain issues. Without proper treatment for these returning veterans, pain becomes chronic, leading to considerable physiological and psychological health problems.

Incorporating the causal models of pain diseases, the mechanisms underlying these models, the evidence basis for treatment and the biopsychosocial influences underpinning them Dr. Gallagher discussed a stepped

Friday Morning Breakout Sessions

care model of pain treatment, a care system that utilizes varied levels of treatment intensity appropriate for each patient's condition. This model provides appropriate treatment for the less critically ill, provides psychosocial treatment for the behavioral instabilities that pain disorders can engender, allows for specialty care for appropriate patients and assures the treating specialty physician that the other factors involved in treating pain outside of specialized techniques are being addressed. It incorporates self-empowerment, community resources, primary care, education and psychotherapy and specialty and sub-specialty pain medicine (see Figure 27).

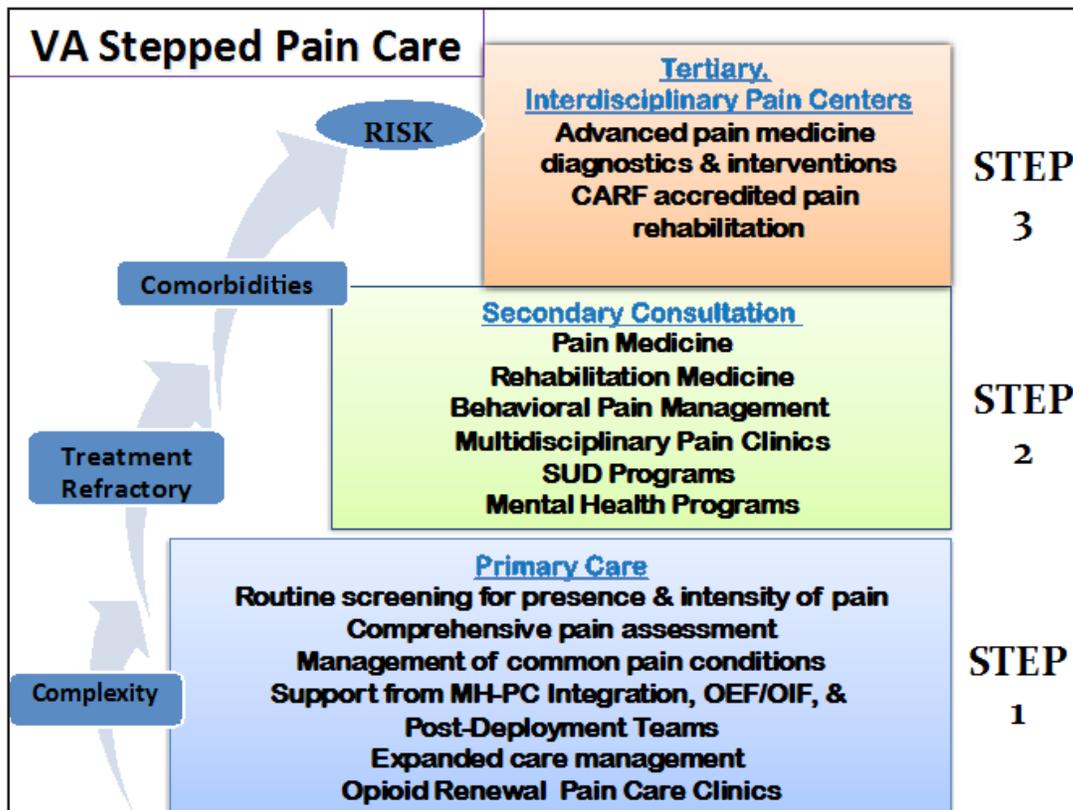


Figure 27. Proposed step care model for pain treatment.

In 2009, the VHA announced the Pain Management Directive that outlined a stepped pain care model and a pain management infrastructure with each facility, and established a set of pain management standards for assessment, treatment, evaluation of outcomes and clinician competence. The incorporation of the stepped care model is an ongoing effort, and there are numerous initiatives underway, including a clinical practice guideline for providers.

Friday Morning Breakout Sessions

Pain Panel

Army Pain Management Initiative: Where We Are

Kevin Galloway, Col., USA, Chief of Staff for the Army Pain Management Task Force

- The state of Army pain management was presented, outlining the strains that the conflicts in the past ten years have placed on the medical system and the over-use of opioid pain medications.
- The Army has a Pain Management Initiative that is addressing all of the gaps in treatment provision, helping to provide less sedating pain management, identifying more subtle forms of encroaching pain symptoms and working on a system that will provide pain management consultation to primary care providers.

Col. Galloway gave a justification for the Army's Pain Management Initiative. He spoke of how the personnel involved in military health care are dedicated to this mission, and this has a positive impact on the ability of the force to accomplish its mission.

The Pain Management Task Force was created to deal with the stress of fighting two wars simultaneously. There were significant weaknesses in the treatment of pain – some of which were pointed out earlier in this breakout session – and a concerted effort was needed to connect the dots on PTSD, TBI and suicide, and address these problems from a higher level of conceptualization.

The over-prescription of opioid pain medication, leading to the non-medical use of prescriptions and the alleged games of “Percocet poker” in the barracks - whether real or not – is an indicator of a problem in pain management. Poly pharmacy is also an issue. The Department of the Army Inspector General (DAIG) report (an Army-initiated, internal survey of opinion) revealed that providers in Warrior Transition Units estimated that 35 percent of their soldiers were addicted to drugs. Another indicator of the inadequacy of pain management is the fact that we are seeing pain clinics popping up outside of installations that are pill mills. There is an unmet need in the system and it shows up in the community. Wounded warriors have complex issues and in order to allow them to do better with their rehabilitation, they need to be alert and orientated, not sedated.

Col. Galloway discussed the inadequacy of pain management for amputees who are returning to duty. Overwhelmingly, these service members do not want to use opioids for pain management, and better alternatives need to be offered. Another aspect of the pain management issue is one of focus - the major injuries have our attention, but the regular wear and tear on our soldiers has not been adequately addressed. It is harder to see the pressing need to treat low back pain, but lack of sufficient treatment of lower level problems can potentially lead to a medical discharge, something that is a financial burden to the military. Most importantly, inadequate treatment imposes a disability on the service member, which can lead to depression.

Col. Galloway discussed the findings of the Multidisciplinary Pain Management Task Force commissioned in May 2010 was an important Army initiative. The task force hopes to combine the best clinical methods with commitment to effectively treat service members by putting available resources in one place and making them accessible. Col. Galloway also discussed Project ECHO, an initiative at the University of New Mexico that will provide expert consultation on pain management for primary care staff. This initiative is important because it is not realistic or necessary for every case of pain management to be seen by a pain specialist, and in fact, most pain can be adequately handled at the primary care level. Backed with a resource and the assurance of an expert, primary care providers will be able to more aggressively and confidently treat pain in presenting patients. Col. Galloway ended with a call for coordinated care within the triservice arena, saying it needs to be synchronous.

Friday Afternoon Breakout Sessions

Implementation Science

Disseminating Cognitive Processing Therapy in VA: The Advantages and Challenges of a National Training Initiative

Kate Chard, Ph.D., Cincinnati VA Medical Center, University of Cincinnati

- Dr. Chard provided a description of cognitive processing therapy (CPT) treatment for PTSD. There have been numerous clinical research trials to support the effectiveness of CPT, and a review of those studies was provided.
- The VA Health Care System (VAHCS) conducted a systematic nationwide implementation of CPT, and Dr. Chard provided a full description of the initiative. A discussion of the advantages and challenges of a large, systemic implementation project was provided.

CPT is a treatment for PTSD that is now being widely implemented in Defense Department and VA settings. Developed in 1988, it is a 12-session course of trauma-focused cognitive therapy. CPT is designed to challenge and examine beliefs and self-blame resulting from a traumatic event. Although it has elements of exposure, the primary goal of CPT is to modify the meaning and interpretation of the traumatic event. Clinical research trials have shown CPT to be effective in reducing the symptoms of PTSD and depression in participants, and recent studies suggest that the effects are long-standing.

Based on the strong evidence for CPT and directives within the VHA to provide evidence-based therapies for veterans with PTSD, the VA decided to implement a nationwide training program to enable VA providers to become proficient in CPT. Dr. Chard mentioned that this was a positive development. Instead of training therapists on a hit or miss basis, (1) the implementation allowed it to be done systematically, (2) there was funding to develop state-of-the-art training materials and the follow-through needed beyond the basic workshop, (3) it allowed the development of national communities of practice to encourage program development and individual provider practice, and (4) it provided therapists a rare opportunity to get support and follow-through and gave a sense of community for isolated practitioners.

Dr. Chard provided a history of the implementation. The first phase (2006-2009) involved development of the needed resources, including the manuals for military and veteran populations, a trainer's manual, videos, a consultant handbook for assisting trainees and a train-the-trainer conference. The second phase (overlapping somewhat with the first phase, 2007-2010) involved providing workshops for therapists across the VAHCS system, as well as providing training for Defense Department and Vet Center personnel. In addition, the second phase also provided consultation phone calls for providers who had specific implementation questions, advanced lectures via teleconference and correspondence and networking with health care administrators across Veterans Integrated Service Networks (VISNs), VAMCs and VA Central Offices. The third phase involves decentralization of the training efforts in order to foster CPT more locally. This phase, which is still ongoing, involves training local trainers in every VISN to take over the role that the implementation team had previously performed, providing systemic changes like session note templates within the computerized record system, and program evaluation of patient and therapist outcomes after the CPT training.

The initial evaluation of the CPT implementation has been positive. From 2007 to 2011 over 6,000 participants attended workshops and over 800 VA providers were trained in CPT, CPT-C (a form of CPT that lessens direct recall of the primary traumatic event) and prolonged exposure (PE) therapies. When combined these therapies have about a 70 percent success rate in reducing PTSD symptoms (as measured by the PTSD Checklist). Therapists trained in CPT consistently rate themselves as more confident in providing CPT after the training.

Friday Afternoon Breakout Sessions

Challenges still exist, and many VA therapists continue to exhibit disdain for evidence-based therapies for PTSD. Dr. Chard stressed the need to keep trainers and workshop participants motivated and willing to continue using CPT.

Currently, CPT is also being integrated into a TBI/PTSD treatment program at the Cincinnati VAMC. Three groups have thus far completed using CPT, and the results show that there is a reduction in PTSD and depression symptoms (see Figure 28). The vast majority of the veterans treated with CPT in this integrated program leave treatment without a PTSD diagnosis.

Pre-post Changes in TBI/PTSD Integrated Treatment				
	Mild TBI (n = 28)		Mod/Severe TBI (n = 14)	
	<u>Pre</u>	<u>Post</u>	<u>Pre</u>	<u>Post</u>
CAPS	75.14	48.96	81.36	37.64
PCL	61.82	46.54	64.93	38.71
BDI-II	32.64	23.71	31.57	18.07

Note. CAPS = Clinician-administered PTSD Scale. PCL = PTSD Checklist. BDI-II = Beck Depression Inventory-II.

Figure 28. Initial findings from study examining CPT for comorbid PTSD and TBI.

Implementation Science

Towards Continuous Implementation of Best Practices in PTSD Care

Josef I. Ruzek, Ph.D., National Center for PTSD, Dissemination and Training Division, VA Palo Alto HCS

- Dr. Ruzek provided a description of prolonged exposure (PE) therapy, an exposure-based treatment for PTSD. PE is a well-researched intervention, and Dr. Ruzek provided examples of its efficacy.
- The VA Health Care System (VAHCS) is implementing PE system-wide, and Dr. Ruzek provided a full description of the initiative. Similar to other implementation programs for evidence-based psychotherapies, there are advantages of, and challenges to, a large, systemic implementation project, and those factors were outlined.

Friday Afternoon Breakout Sessions

PE is a treatment for PTSD that is now being implemented in Defense Department and VA settings. It involves imaginal exposure of the patient to the traumatic event to allow for reprocessing of the experience. Treatment consists of an average of eight to fifteen 90-minute sessions, and includes repeated in vivo exposure, education about common reactions to trauma and simple relaxation techniques (e.g., diaphragmatic breathing). PE is effective at reducing PTSD symptoms improving function and reversing the PTSD diagnosis (see Figure 29).

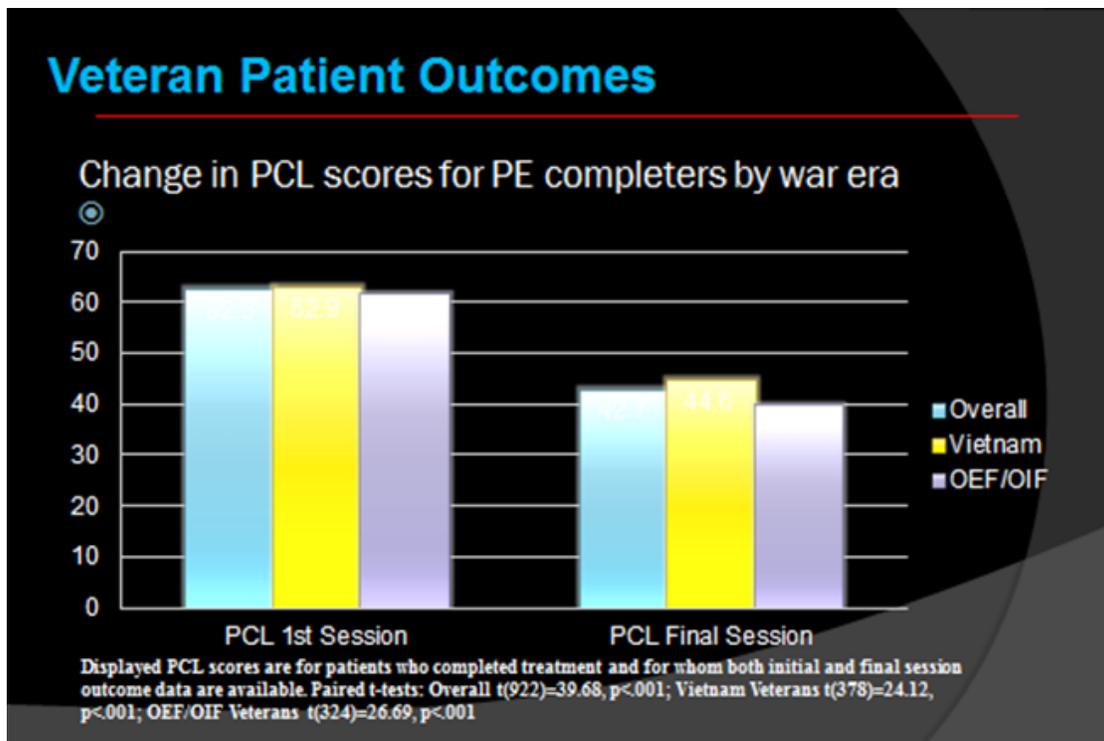


Figure 29. PTSD Checklist scores before and after PE in different combat cohorts.

Based on the strong evidence for PE and directives within the VHA to provide evidence-based therapies for veterans with PTSD, the VA has implemented a nationwide training program to allow VA providers to become proficient in PE. Similar to the initiative for CPT described by Dr. Chard, the dissemination and implementation plan for PE involved (1) training the critical mass of VA providers in PE, (2) balancing adherence and flexibility of implementation, (3) an intensive training model supported by research and experience and (4) establishing ongoing capacity within VHA for its training and implementation. The initiative used a train-the-trainer model to generate local ability and support for PE, and included a four-day intensive training session followed by weekly consultation and videotape review. Over 1,300 VA clinicians have been trained and 822 have completed the consultation stage.

Results have been positive. Despite the difficulty of implementing PE with fidelity due to a tendency of therapists to lessen requirements to accommodate patient resistance to exposure, results of the initiative show excellent therapist treatment fidelity (see Figure 30). Most importantly, veterans showed significant improvement on measures of PTSD symptomatology. Despite the usual impediments to implementation (e.g., leadership support issues, time to implement PE, 90-minute time slots, managing referrals and dropouts, etc.), the initiative was a success.

Friday Afternoon Breakout Sessions

PE Sustainability Six Months Post Consult

PE use six months after the end of consultation

- 90% of clinicians have used PE with patients in the six months after consultation
- 73.7% report following the PE manual “very closely” (an additional 24.9% report following the manual with “minor changes”)
- 98.7% of clinicians believe that PE is at least as effective or more effective than other treatments used previously
- 85% of clinicians indicate that they “definitely will” use PE in the future with their PTSD patients

Figure 30. Results of a PE dissemination initiative.

Although implementation has been successful, Dr. Ruzek stated that he and his fellow collaborators think that more needs to be done to help implement evidence-based treatments like PE into frontline clinics. Some problems yet to overcome include that PE requires intensive staffing, which will seldom be available, it is often performed in mental health programs that require referrals and mental health treatments like PE are difficult to deliver in primary care, employee assistance programs or natural helping environments.

An idea that experts are beginning to explore is using technology to increase the use of best practices in VA and Defense Department care, with the use of internet- and phone-based interventions in stepped care systems. Dr. Ruzek mentioned the many websites (e.g., afterdeployment.org) are available to assist service members and veterans in obtaining quality care. A number of smartphone apps (e.g., PTSD Coach, etc.) are being created at the National Center for Telehealth and Technology and were outlined at this conference during the plenary talk by Dr. Gahm on Thursday morning. Also in development are Professional Resources Online (PRO) websites to assist providers in getting resources needed to implement the new interventions. However, Dr. Ruzek stated that the most important element to implementing PE and other evidence-based treatments is a strong infrastructure to support clinicians and promote the therapies after the initial training and follow-up conclude.

In closing, Dr. Ruzek made several key points: (1) practitioner training and ongoing dissemination is fundamental to improvement of mental health care, (2) existing methods of implementation are not fully up to the task, (3) it is extremely difficult to get clinicians to change practices, especially where new skills are required, (4) changes displace something else in the system, creating kickback, (5) more sophisticated multifaceted approaches are required and (6) organizations should dedicate adequate resources for dissemination infrastructures.

Friday Afternoon Breakout Sessions

Implementation Science

Implementing Telephone-based Care Models for Depression and PTSD in Primary Care

Bradford Felker, MD, Director Mental Health Primary Care Service, Director Deployment Health Service, Puget Sound Health Care System; Associate Professor, University of Washington School of Medicine, Department of Psychiatry and Behavioral Sciences

- Veterans receiving treatment at VA primary care clinics commonly have comorbid PTSD and depression. This co-occurrence adversely affects veteran well-being and has negative health associations.
- Dr. Felker described the VA's Translating Initiatives in Depression into Effective Solution (TIDES) project, a Quality Enhancement Research Initiative (QUERI) approach that used telephone-based care to integrate mental health and primary care services. Initial outcomes from this initiative were positive and the VA is now rolling this program out on a national level.

Comorbid conditions are very common among veterans, with two diagnoses occurring in 29 percent and three or more diagnoses occurring in 27 percent of veterans. Over 50 percent of those with depression are seen only by a primary care provider. Patients with a combination of depression and PTSD have an increased incidence of suicidal ideation and more frequent use of outpatient health care resources. Considering these factors, it is imperative that the health care systems bridge the gap between evidence-based practices for this issue and current clinical practice. To accomplish this, the VA has developed an Evidence-based Quality Improvement (EBQI) program that uses a combined top-down and bottom-up approach to measure quality improvement in treatment approaches to translate evidence-based procedures into routine practice.

The TIDES project used the EBQI process to implement multiple evidence-based models of care. It is an initiative that comes from the VA's QUERI program, a research-practice initiative to assist the VA in developing and implementing evidence-based practices. The project combined phone scripts, education, collaboration and care management and patient self-management support approaches using multiple Plan-Do-Study-Act (PDSA) cycles. The Patient Health Questionnaire (PHQ) and PTSD Checklist (PCL), which screens for bipolar and dysthymia, were used as measures. Results of this project revealed an increased patient satisfaction, with 89 percent remaining in care management, and of those, 74 percent stayed on medication and 90 percent kept clinic appointments. After six months, 90 percent of primary care patients and 50 percent of MHS patients achieved resolution of their depressive symptoms (see Figure 31).

Friday Afternoon Breakout Sessions

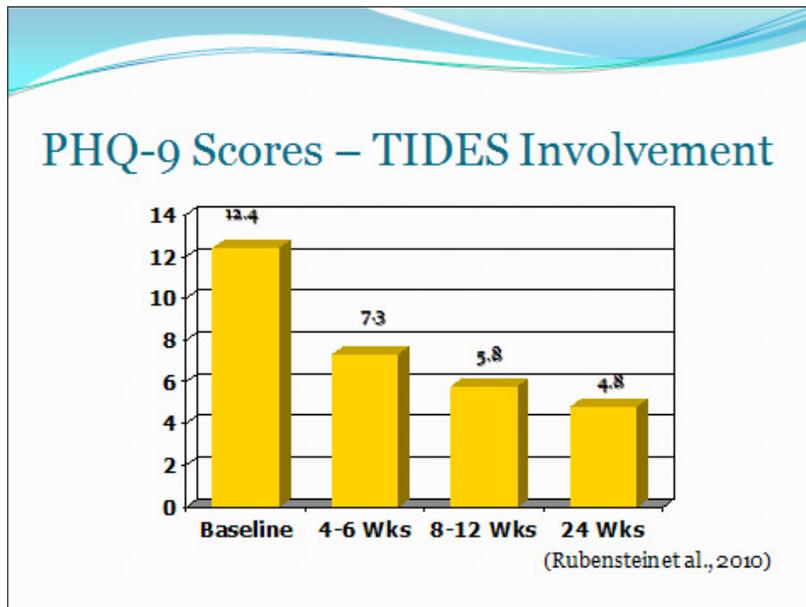


Figure 31. Results of a phone-based intervention to treat depression in primary care settings.

The positive results of a pilot study are being used to adapt the TIDES templates to treatment of veterans with depression and PTSD. It will be studied in two large VA primary care clinics implementing the Program for Assertive Community Treatment (PACT). The lessons learned will be used to tailor other programs seeking to develop models of care within PACT. This study has shown, like many other studies reviewed at this conference, that integrated care is particularly effective in treating OEF/OIF veterans (see Figure 32).

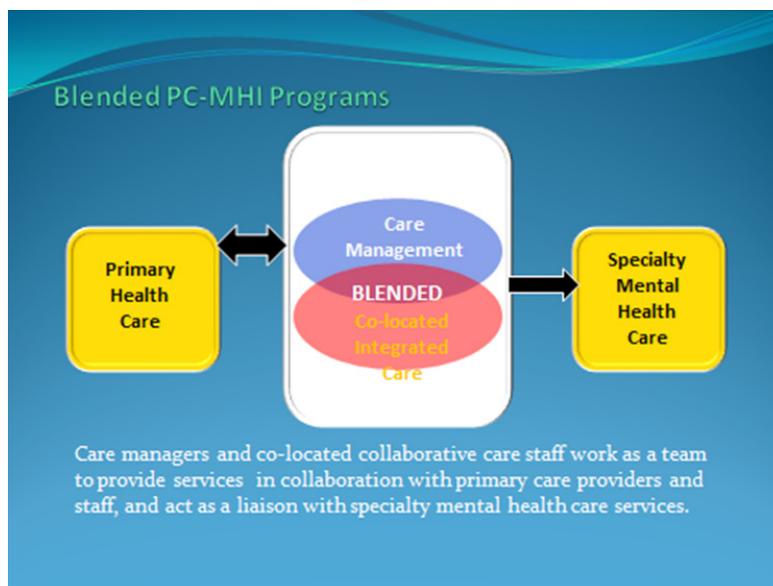


Figure 32. Diagram of an integrated mental health care intervention for use in primary care settings.

Friday Afternoon Breakout Sessions

The EBQI process can be used to power programs at the national level. For example, it is being applied to a phone outreach project at the Puget Sound Deployment Health Service. Under the new model, a group of PCPs, MHPs and MSWs are trained to provide deployment health, a service resulting in a designated skill set that is added to their clinical competencies. MSWs followed a phone script to gather all the needed information from patients over the phone before they came to the clinic, and addressed immediate concerns and clinical reminders. Many of the patients were coming off of active duty, and they were all referred to the VA for the first time. Providers expressed appreciation for not having to start from scratch with each new patient. Patients reported feeling more connected and appreciated getting calls to initiate mental health and social work treatment if needed.

Speech and Language Pathology Guidance

Speech-Language Pathology Guidance: Cognitive-Communication Rehabilitation for Concussion/mTBI in the Military Population

Micaela Cornis-Pop, Ph.D., Office of Rehabilitation Services, VA Central Office and Carole Roth, Ph.D., Naval Medical Center San Diego

- The Speech-Language Pathology Clinical Management Guidance was described in detail as to its purpose, development, environment of care and guidance on the proper assessment of dysfunction and treatment of speech and language pathology in service members and veterans with concussion or mild traumatic brain injury (mTBI).
- Case studies were presented, providing examples of patients and actual techniques that are helpful in treating TBI patients.

Numerous cognitive skills are needed for the proper use of language and communication, including self-awareness and goal setting, planning, flexible thinking and self-directing/initiating, self-inhibition/monitoring/evaluation. These are all factors that can be impacted by a TBI. To address the numerous factors that need to be considered in treating speech-language pathology in active duty service members and veterans with head trauma, a Defense Department/VA Speech Language Pathology (SLP) Working Group was formed to create a clinical management guideline (CMG) to provide speech language pathologists with clinical guidance for cognitive-communication assessment and interventions for patients with post-concussion/mild TBI cognitive-communication deficits. To ensure that clinical decisions are based on empirical or best available evidence, the working group thoroughly reviewed the research literature, existing guidelines and documents, the consensus recommendations of experts with research and clinical experience in cognitive-communication rehabilitation in the Defense Department, the VA, civilian and academic settings and feedback from patients. The intention of the CMG is to address the unique needs of military and veteran populations with reference to returning to duty or work, balancing military and family relationships, readjusting to civilian life and becoming aware of the risk for posttraumatic stress disorder and other comorbidities, including pain, headache, irritability, sleep disturbances and poor anger management. It is not intended for moderate-to-severe TBI, concussion or mTBI in the acute phase (less than seven days after injury).

The CMG covers all aspects needed for a speech language pathologist to treat patients in VA or Defense Department settings. It provides a background of mTBI, mTBI within the military system, the communication-related sequelae of mTBI, assessment of cognitive communication disorders, treatment of cognitive communication disorders in mTBI and return to duty or community for patients. It advocates for a stepped care model in addressing cognitive communication deficits in service members and veterans coming to primary care (see Figure 33).

Friday Afternoon Breakout Sessions

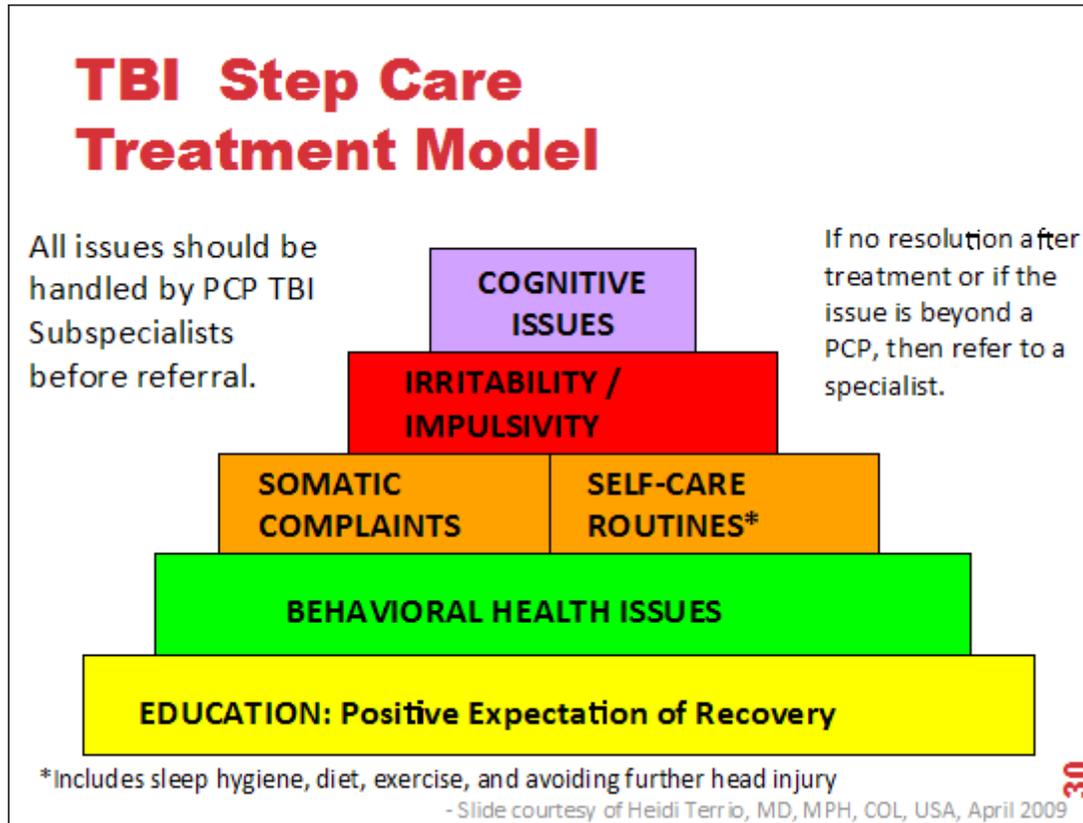


Figure 33. Diagram of a proposed step care model for treating mTBI.

When first reporting symptoms, providers educate patients on the expectation of recovery and review temporary neural events of concussion and the recovery process. A strong emphasis is placed on expected improvement, sleep hygiene, diet, social communication skills, encouragement of recreation and the need for keeping a positive attitude and self-confidence. The focus of treatment is to address the presenting symptoms and comorbidities, encourage empowerment and identify persisting symptoms. If after three months there is no noticeable improvement, patients are then advanced to a more intensive stepped-up care that involves assessment of cognitive, neurological, communication-related and social functioning. It then advocates for care from an interdisciplinary treatment team that is reflective of the assessment and respectful of the patient's particular situation and strengths/deficits (e.g., attention, memory, executive function, social communication, fluency problems). The CMG notes that the interdisciplinary treatment teams are most effective when they develop plans to include the individual and family/support systems, individualize each plan of care with interdisciplinary goals, regularly review each plan of care and have the team members participate in continuing education and program development. Case studies were then reviewed showing the factors that are involved in constructing a solid treatment plan for patients. In addition, the specific treatments for certain speech difficulties (e.g., stuttering) and the potential complications in applying them were addressed.

Friday Afternoon Breakout Sessions

AHRQ Implementation

Mapping the Evidence: The AHRQ Evidence-Based Practice Centers

Stephanie Chang, M.D., M.P.H., Director, Evidence-based Practice Center Program, Agency for Healthcare Research and Quality

- Evidence-Based Practice Centers conducted systematic reviews to answer specific questions about the effectiveness of clinical interventions.
- Evidence-Based Practice Centers provide opportunities for involvement from stakeholders (e.g., clinicians, administrators, policymakers) and additional resources to translate research into useful clinical tools.

When selecting interventions, they may all look similar, and it can be difficult to know which direction to take. Systematic reviews can map where the evidence is and where it is not, and when they are developed, facilitated. These are the goals of the Evidence-Based Practice Centers, supported by fourteen contractors located throughout the United States and Canada. These centers use an explicit systematic process for reviews, taking about eighteen months to answer each question. This process involves a comprehensive review of all available literature, asking critical questions such as “Are the studies done correctly?” and “What are the potential biases in the research?” The Centers then summarize all of the literature through qualitative, quantitative and/or meta-analyses into reports often several hundred pages long. The primary goal is to distill the research to draw conclusions about the strength of the evidence to help providers and decision makers determine if a particular treatment is appropriate and applicable.

Evidence is only one part of the question the centers address. Evidence-based practice (EBP) also involves decision making based on costs, values, resources and feasibility. The next step, comparative effectiveness research, is not basic science research; it involves trying to engage with stakeholders (e.g., clinicians, administrators, policymakers) to address questions on the systemic implications of these interventions. A collection of evidence is not always helpful and may be complicated and confusing, and to use an analogy central to this conference, knowledge of the evidence is like having a good map – it will outline our present location and where we would like to go, but a “bridge” still needs to be built to get us across the “gap.” The Centers also develop brief evidence reports that indicate where future research is needed, and they translate voluminous reports into consumer and clinician guides that are concise and actionable, as well as provide additional resources including podcasts and CME opportunities.

Providers and stakeholders are encouraged to become involved in the work of the Evidence-Based Practice Centers by visiting their website, effectivehealthcare.ahrq.gov, and signing up to be notified when research is available for comment as it begins and as reports are drafted and finalized.

Friday Afternoon Breakout Sessions

Trauma Center Interventions

Traumatic Brain Injury: A Trauma Surgeon's Disease

*Oscar Guillamondegui, M.D., M.P.H., F.A.C.S., Trauma Medical Director,
Vanderbilt University Medical Center Trauma Center*

- Approximately 100,000 TBI patients will have long-term disability and 50,000 die annually, with intracranial hemorrhagic injury (IHI) contributing to longer hospitalization and increased mortality.
- Across a variety of medical settings and independent of other variables, depression, PTSD and anxiety are more common among patients with a history of concussion, and traumatic brain injury is associated with long-term changes in cognitive functioning, senses such as hearing, and mental health.
- Trauma centers can be considered the epicenter of major TBI triage settings, with hospitalization increasing 10 percent each year, and comprehensive evaluation clinics, in such settings, may play a critical role in the early identification and multidisciplinary treatment of TBI.

In 2007, the American Association for the Surgery of Trauma (AAST) issued a white paper mission statement about acute care surgery. In terms of neurosurgical intervention, it suggested that trauma surgeons be able to perform intracranial pressure monitor (ICPM) placement and external ventricular drain (EVD) placement. However, neurosurgical colleagues have a broader role and are an integral part of the overall mission of working with TBI.

Approximately 1.4 million Americans annually sustain a TBI through sports, falls, motor vehicle collisions, being struck by a car, physical assault, IED blast exposure, etc. TBI costs approximately 1.5 million life-years per year, and it affects all levels of society. Although 90 percent of mild TBI patients recover quickly, research suggests that anywhere from 10-25 percent of TBI patients have long-term deficits and 34 percent are unable to quickly return to work. Compounding these problems is the fact that there is a large pool of individuals with unidentified TBI who may be experiencing emotional distress and cognitive issues.

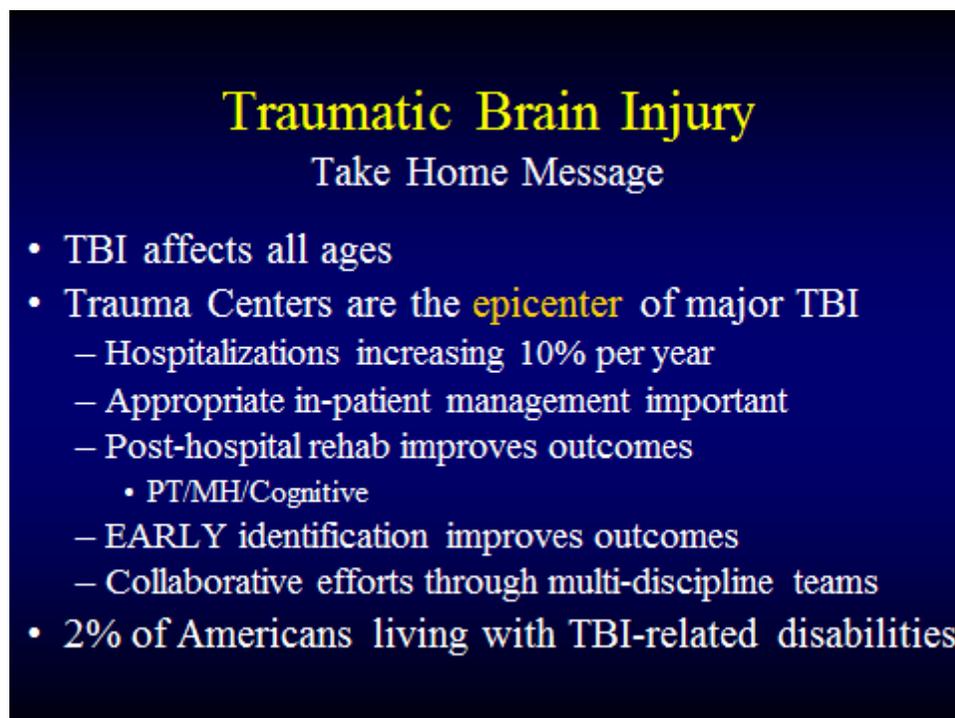
In the context of acute care for TBI, time is crucial. The trauma team's job is to protect the patient from low blood and oxygen-flow states. Immediate interventions may involve repeat head CT scans for symptoms of neurological deterioration, sedation for those with EEG burst suppression, intracranial pressure monitoring, hyper-osmolar therapy, anti-seizure prophylaxis, and decompressive craniotomy. Overall, the intracranial hemorrhage injury (IHI) progression rate with the standard intermediate intervention is approximately 16 percent. Given that IHI progression is significantly associated with more severe Glasgow Coma Scale (GCS) and Head/Neck Abbreviated Injury Score (H/N AIS) scores, IHI may require increased neurosurgical interventions, with mortality rates varying depending upon the intensity of the procedures required.

Long-term outcomes are difficult to track considering the inconsistency with which providers follow TBI patients. Adding to this difficulty is that a number of specialties are often involved in treatment, including trauma, neurosurgery, speech pathology, physical medicine and rehabilitation, psychiatry, psychology and many other disciplines. The imperative question is "Which patients, anywhere, have cognitive changes and what are they?" Screening tools should focus on potentially overlooked populations across settings to identify TBI and assist patients in identifying helpful treatments like cognitive rehabilitation.

Comprehensive evaluation clinics may offer a solution to the problems of the under-identification and poor follow-up with TBI patients required to improve long-term outcomes. Vanderbilt University has a free clinic of

Friday Afternoon Breakout Sessions

this sort, offering cognitive analysis, mental health assessment, quality of life surveys, social work services, and peer groups for support to trauma survivors and family members. The next steps include expanding trauma patient registries and improving radiologic imaging techniques (e.g., diffuse tensor imaging) as well as prevention methods. Dr. Guillamondegui concluded with a summary of the points discussed in the presentation (see Figure 34).



Traumatic Brain Injury
Take Home Message

- TBI affects all ages
- Trauma Centers are the **epicenter** of major TBI
 - Hospitalizations increasing 10% per year
 - Appropriate in-patient management important
 - Post-hospital rehab improves outcomes
 - PT/MH/Cognitive
 - EARLY identification improves outcomes
 - Collaborative efforts through multi-discipline teams
- 2% of Americans living with TBI-related disabilities

Figure 34. Take home points on treating TBI in trauma centers.

Access to Recovery

Access to Recovery: Meeting the Needs of Veterans and Military Service Members

Linda K. Fulton, Ph.D., Public Health Advisor, Substance Abuse and Mental Services Administration

- Military personnel, returning veterans and their families present unique challenges for the behavioral health community. The Access to Recovery (ATR) program has made serving the military, veterans and their families a priority.
- The goals of ATR grants are to provide clients with choices among eligible providers; increase access to comprehensive services, including faith-based and wraparound recovery support services (e.g., transportation and housing) and expand capacity for substance use treatment.

Our government leaders and the Substance Abuse and Mental Services Administration (SAMHSA) are committed to addressing mental health and substance abuse issues with the same urgency and expertise as untreated wounds. SAMHSA has strategic initiatives that include community-based treatment of military members and their families. The ATR program is housed under the Center for Substance Abuse Treatment

Friday Afternoon Breakout Sessions

and the Division of Services Improvement. ATR is SAMHSA's largest discretionary grant program, and grants were awarded to 24 states and six tribal organizations. Unique features of ATR grants include use of electronic voucher management systems for services/needs, providing recovery-oriented treatment and ensuring patients can obtain services from sources with which they are most comfortable, including faith-based organizations via indirect payment.

The conceptual framework and approach to ATR is client-centered, community-based, integrated or whole-person, and recovery-oriented. A traditional approach is for clients to enter treatment when symptoms have become the most severe, often as crisis-management, while a recovery-oriented response employs a continuous treatment approach (see Figure 35), connected to treatment throughout the recovery process, with a goal of improving overall functioning and reducing the "revolving-door," intermittent delivery of treatment (see Figure 36).

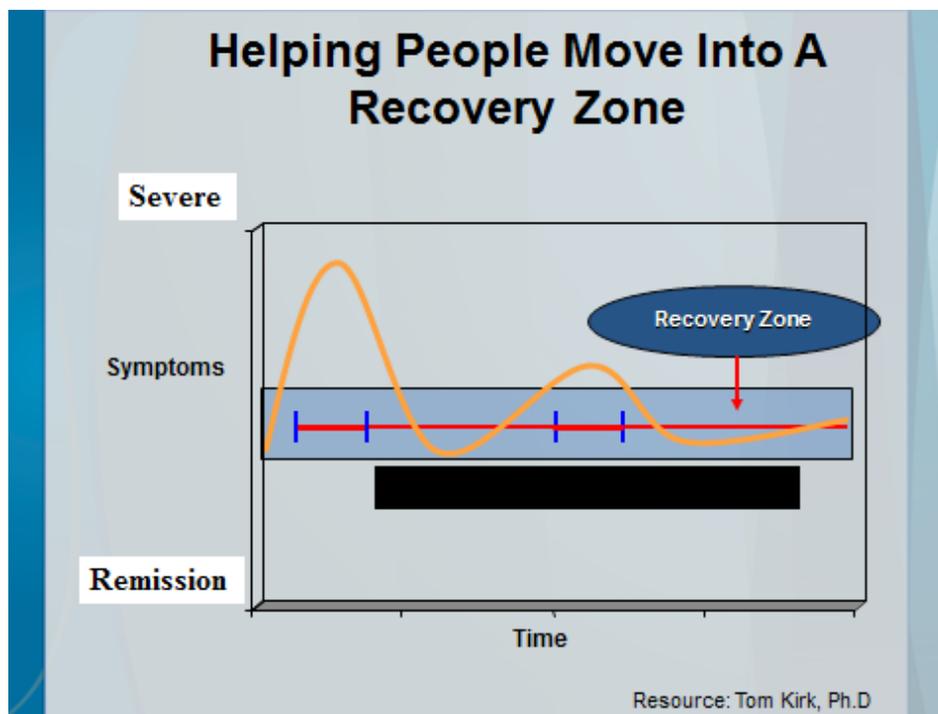


Figure 35. Access to Recovery model of continuous treatment for chronic substance abuse.

Friday Afternoon Breakout Sessions

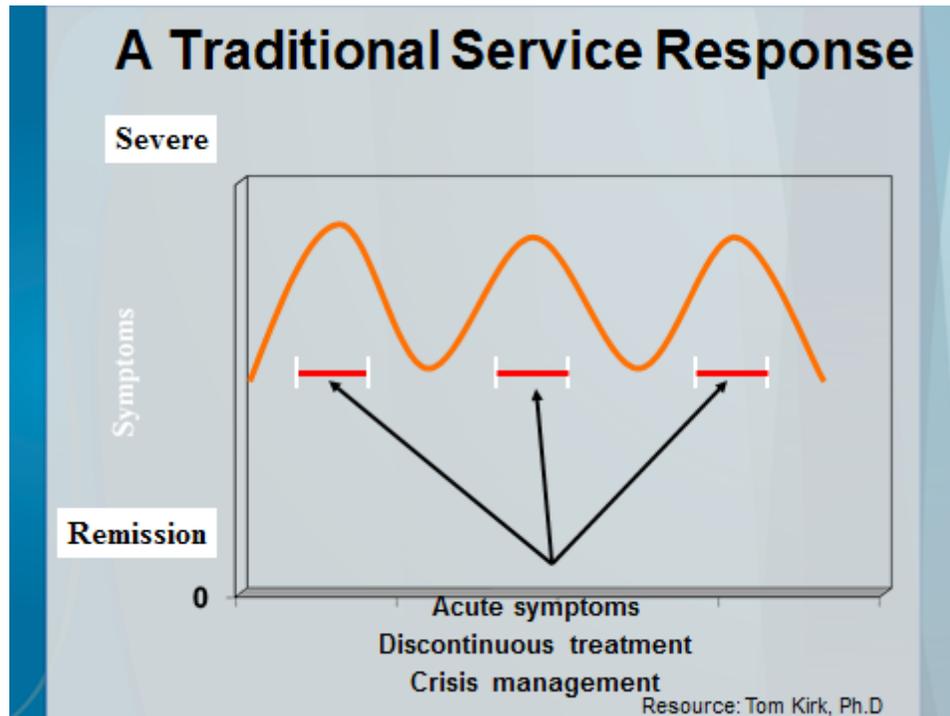


Figure 36. Traditional substance abuse treatment course, with intermittent treatment.

In ATR, each client is assigned a care coordinator to help him/her stay on track with program goals and personal recovery goals. However, the principle of recovery is self-directed, and the client is very involved, choosing his/her own assessment vouchers and providers, with many pathways to recovery. ATR has a collaborative relationship with the National Guard, a service in which members highly value access to community-based treatment. This collaboration has been helpful in providing services to members who may not want or have access to traditional services through the military. ATR has served 7,300 members of the National Guard and 6,900 family members. Operation Immersion, another unique feature of the ATR/National Guard collaboration, is designed to help behavioral health care providers understand the needs of National Guard members by allowing them to get a better sense of a service member's experience by immersing them in a working military environment.

Performance data on ATR show that the grants have been successful, with measures including abstinence rates, criminal justice involvement, employment/education and housing stability. The goal was to serve 60,000 clients and this was exceeded at a rate of 113 percent intake coverage. Recovery support services account for 61 percent, and direct clinical services account for 39 percent.

Additional resources are provided to ATR grantees, including SAMHSA Technical Assistance Packages, which are available at atr.samhsa.gov.

Friday Afternoon Breakout Sessions

TBI Data Sharing

Getting Further Faster by Sharing TBI Research

Ramona Hicks, Ph.D., Program Director, Extramural Research Program, National Institutes of Health/ National Institute of Neurological Disorders and Stroke (NINDS).

- This presentation provided (1) a background, (2) an overview and (3) updates on federal efforts to facilitate data-sharing among researchers and experts in traumatic brain injury (TBI) research.
- Two main data-sharing initiatives were discussed, the TBI Common Data Elements project and the Federal Interagency Traumatic Brain Injury Research (FITBIR), which will allow researchers to more effectively compare results and increase researchers' ability to detect dysfunction and design effective treatments.

Despite its devastating effects and focused attention from the research community, efforts to improve the treatment of TBI have advanced at a slower than expected rate. TBI is a complex problem because of the variable ages of the victims, level of severity of injuries, and types of injuries and responses to treatment. Currently, there are 229 recommendations in seven TBI treatment guideline publications, but only four of them are based on class I evidence. Clinical research trials of TBI treatments are not succeeding, over 20 compounds and therapeutic interventions have been tested with numerous phase 2 and 3 trials in the last three decades, and none has demonstrated effectiveness. The consensus is that current diagnostic and prognostic tools used by researchers are not capable of providing sufficient data to detect all aspects of the pathology in TBI and develop new treatments.

A significant part of this problem is the lack of coordination among TBI researchers. Dr. Hicks pointed out that most TBI researchers lack knowledge of each other's research and are reluctant to share the hard earned raw data that they collect. In addition, most researchers use different methods, different participants in different locations, and different settings on identical imaging instruments, making combining or comparing results problematic. To address this problem, there have been significant efforts to facilitate data-sharing in TBI research as outlined in this breakout session. By creating data-sharing platforms, researchers will more easily be able to facilitate meta-analyses, enable new analyses, ask novel questions and link seemingly disparate research and symptoms – an important factor given TBI's high rate of comorbidity. Creating data-sharing platforms is a difficult process, as it requires strict standardization, an informatics platform, a common set of policies that all participants must agree on, and a collaborative research community. Nonetheless, numerous efforts are currently underway in the hope of developing new treatments.

One of the leading data-sharing efforts is the TBI Common Data Elements project that is being sponsored by NINDS (commondataelements.ninds.nih.gov). A common data element (CDE) is a logical unit of data, pertaining to information of one kind that has a defined name, precise definition, clearly enumerated values and can be used in multiple clinical studies, as determined by a working group of experienced clinical researchers. There are different classifications of CDEs – the core CDEs that are a minimal set of measures to characterize a broad spectrum of subjects, disease-specific CDE's that should be used in all studies of that particular disease, disease supplemental CDEs, which are an extended set that are common but supplemental to the disease and disease-specific exploratory CDEs that are under development and the focus of experimentation. A major advantage of the CDE project is that it will allow for research across all neurological disorders (see Figure 37), allowing scientists to detect possible patterns that previously could not have been detected.

Friday Afternoon Breakout Sessions

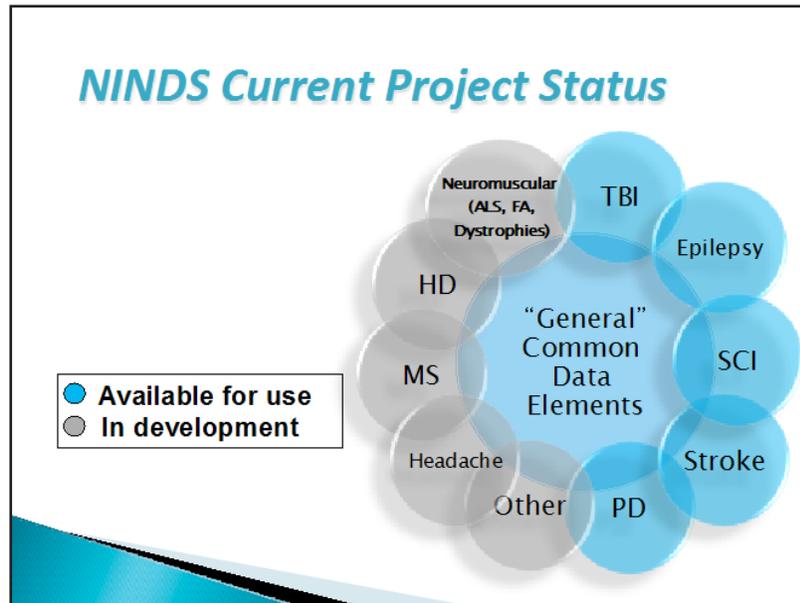


Figure 37. Diagram outlining the disorders assessed in the CDE project.

Another initiative to improve data-sharing is the Federal Interagency Traumatic Brain Injury Research (FITBIR) database that is designed to accelerate comparative effectiveness research on brain injury treatment and diagnosis. It is a collaborative effort between the Defense Department and the National Institutes of Health to build a TBI-focused database and improve treatment for service members. These initiatives are works in progress, and researchers are very excited by the potential they hold to improve the lives of those who have experienced a TBI.

TBI Data Sharing

Real World Experience with Implementing the TBI Common Data Elements

David O. Okonkwo, MD, Ph.D., University of Pittsburgh

- Dr. Okonkwo discussed the lack of progress in developing novel pharmacological and medical treatments for TBI. He noted that this has been compounded by an inability to collect data that can be aggregated across different sites.
- The Traumatic Brain Injury Common Data Elements initiative was presented. A discussion of the steps needed to integrate this initiative in frontline clinics followed, highlighting the challenges and opportunities of this initiative.

Dr. Okonkwo pointed out that there have been significant advances in TBI treatment, including a decrease in mortality rates from 80 percent to less than 30 percent brought on by medical interventions, including better resuscitation methods, improved trauma systems and ICU care. In addition, there have been major prevention successes, including the use of helmets, airbags, improved auto engineering and more effective traffic laws. There are also better protocols for treating trauma patients, and there have been significant advances in rehabilitation and social integration of patients with disabilities. Despite all of these gains, there have been no FDA-approved neuro-protective therapies developed after 28 Phase III trials.

Friday Afternoon Breakout Sessions

Dr. Okonkwo discussed the clinical aspects of implementing the TBI Common Data Elements (CDE) initiative, which was introduced by a fellow speaker earlier in the breakout session, and how it is carried out in a trauma setting. He referenced the Scientific Workshop on the Classification of Traumatic Brain Injury for Targeted Therapies and its recommendations to broaden TBI trials to (1) include less severely injured patients, (2) improve CT imaging classification and (3) increase the early use of MRI and Phase II trials. However, he stated that the landmark event to come from the workgroup was the consensus to determine a common set of data elements and technical standards that can be used and implemented across various settings to more accurately detect pathology and develop treatments.

Dr. Okonkwo discussed working with the TRACK-TBI network, a joint effort between the National Institute of Neurological Disorders and Stroke (NINDS), the National Institute on Disability and Rehabilitation Research (NIDRR), the Defense and Veterans Brain Injury Center (DVBIC) and DCoE to develop consensus-based common data elements (TBI-CDE) for traumatic brain injury and psychological health (see [tracktbi.net/tracktbi/](http://tracktbi.net/)). The goal of the TRACK-TBI study is to evaluate the feasibility and utility of the TBI-CDEs and to extensively phenotype a cohort of TBI patients across the injury spectrum from concussion to coma. The TRACK-TBI network is developing, testing and refining standards for data collection in TBI studies using a pilot study at several high-volume TBI Centers. Overall, enrollment in this network has been successful. More than 652 patients have participated over a nine-month period, the majority from acute care sites.

The TRACK-TBI collaborators have worked very hard to create standards for structural magnetic resonance imaging (MRI) to allow for combining imaging data from various sites. They have been successful in implementing this important initiative. One of the findings to come from this improvement in standards is that 27 percent of patients with a normal CT scan after head trauma showed brain injury (i.e., axonal injury, hemorrhagic contusion or both) with an MRI scan. This allows researchers and providers to identify patients with injuries who may benefit from treatment but are normally discharged from care after a negative CT scan. In addition, greater standardization allows physicians to more accurately identify the source of the injury and prescribe appropriate treatments. Dr. Okonkwo provided case examples of how a standardized assessment can improve treatment effectiveness.

TBI Data Sharing

New Outcomes Measurement Systems for Biomechanics and Rehabilitation Research

David S. Tulsky, Ph.D., Director of Research, Department of Physical Medicine and Rehabilitation, University of Michigan Medical School

- Traumatic brain injury researchers are very interested in developing data sources that are standardized and follow individuals over a significant period of time that will allow for evaluation of new and developing treatments.
- Dr. Tulsky discussed numerous initiatives throughout biomechanical rehabilitation research, including standardization, new techniques to create questions to ask patients and expanding the types of questions to include quality of life factors.

Conducting quality research on improving outcomes for patients who experience physical trauma requires standardized, longitudinal data on a range of different factors. There have been numerous initiatives to develop new outcome measurement systems for biomechanics and rehabilitation research on TBI and traumatic spinal cord injury (SCI) that attempt to assess a broad constellation of physiological changes and secondary medical complications that significantly impact patients' health-related quality of life. In addition, there has been a rapid increase in the number of clinical trials designed to restore functioning or improve

Friday Afternoon Breakout Sessions

secondary conditions following a traumatic injury. However, the traditional outcomes have not kept pace with the science as the traditional scales often use generic patient-reported outcome measures, which lack the sensitivity and specificity needed to detect meaningful differences in rehabilitation intervention research. Since 2004, several institutes from the National Institutes of Health have shared a mutual vision to re-engineer and revolutionize the way patient-reported outcome tools are created, selected and employed in clinical research and practice.

This presentation provided an overview of the advances in measurement that are on the horizon that promise to greatly enhance biomechanical rehabilitation research in the years to come. A description of advanced statistical methods, including item response theory, and advanced technological tools such as computerized adaptive testing were provided, and showed how they are improving the assessment process. It was pointed out that content validity can be greatly enhanced through qualitative research to identify key issues in relevant patient groups, and can facilitate the linking of scales targeted to specific populations (e.g., SCI and TBI).

The Patient-Reported Outcomes Measurement Information System (PROMIS) funded as a grant within the NIH Roadmap Initiative is a large bank of patient-reported outcomes that focus on a wide range of domains of function in the physical, mental and social arenas. The PROMIS team has developed and tested a large bank of patient-reported outcomes, and created a computerized adaptive testing system for efficient psychometric testing and robust measurement. The PROMIS data set contains information on over 40,000 Spanish- and English-speaking adults and children, and is publicly accessible (nihpromis.com). PROMIS allows researchers to compare symptoms and variables across different medical conditions, and there are currently 30 research protocols aligned with it. This initiative brings precision, efficiency and standardization to the data used to research effective treatments for TBI.

Dr. Tulskey also discussed the Quality of Life in Neurological Disorders (Neuro-QOL), a comprehensive data set that was funded as a contract from the NINDS to measure quality of life in neurological disorders. It covers physical, functional, emotional, cognitive, social and sexual functioning domains developed specifically for individuals with TBI. Subsequently NIH, the NIDRR and the VA Rehabilitation Research & Development Program have all provided funding to take this work to rehabilitation medicine, with particular focus on spinal cord injury and traumatic brain injury research.

Another initiative is the NIH Toolbox for assessment of neurological and behavioral function (nihtoolbox.org) that is striving to be a brief yet comprehensive set of assessment tools measuring motor, cognitive, sensory and emotional function. It was developed to unify and integrate measures of multiple indicators of neural and behavioral health functioning and can be used across diverse study designs and populations. It is a large-scale initiative across seventeen NIH institutes and centers that will have normative data, and an English and Spanish version with a direct link to existing pediatric and adult measures that will facilitate the generation of novel constructs and fill knowledge gaps. When complete, the toolbox will allow cross-comparisons, be dynamic and adaptable over time and assess normal functioning as well as impaired functioning.

Friday Afternoon Breakout Sessions

Implementation of Neuroimaging

An Automatic MEG Low-Frequency Source Imaging Approach for Detecting Injuries in Mild and Moderate TBI Patients with Blast and non-Blast Causes

Mingxiong Huang, Ph.D., Department of Radiology, University of California, San Diego School of Medicine

- Magnetoencephalography (MEG) can be used to detect pathological slow-wave magnetic signals generated by injured brain tissues following mild traumatic brain injury.
- Analyzing MEG slow wave in TBI patients has a 90 percent positive detection rate in cases of mild TBI and 100 percent in moderate TBI cases.

Mild TBI is a significant problem, but is difficult to detect via neuroimaging methods such as CT and MRI because they are not sensitive enough to detect various mechanical insults such as axonal injury. However, injured brain tissues in mTBI generate pathological slow-wave magnetic signals that can be measured and localized by magnetoencephalography (MEG). Few studies of mTBI integrate grey-matter MEG slow-wave with white-matter diffusion tensor imaging findings (DTI), two techniques that measure two different aspects of injury. Incorporating MEG slow-wave measurement can improve the detection of traumatic brain injury and its severity level. The benefits of MEG include that it is non-invasive, can be performed over and over, provides better spatial localization accuracy than high-density EEG, and uses a VESTAL algorithm that has been shown to be effective in analyzing MEG data.

Dr. Huang expressed great hope for the use of this technology in TBI assessment. He provided a “take-home” message that MEG is effective in identifying injuries that are correlated with patient outcomes (see Figure 38).

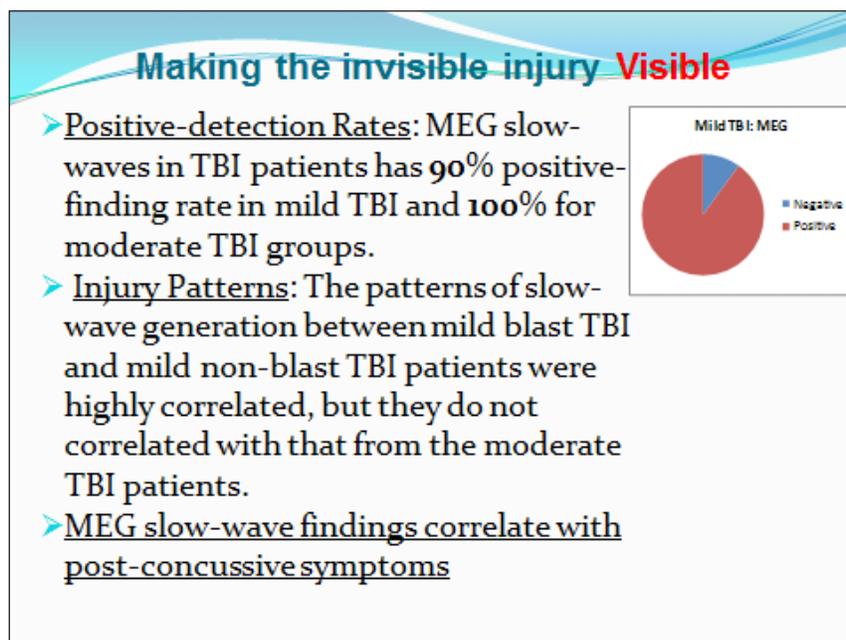


Figure 38. Positive factors associated with the use of MEG in detecting TBI.

Friday Afternoon Breakout Sessions

Intracranial Pathology on MRI

Larry Latour, Ph.D., Stroke Diagnostics and Therapeutics Section, Stroke Branch, National Institute of Neurological Disorders and Stroke, National Institutes of Health

- CT scans can often miss features of mild traumatic brain injury that can be detected using MRI.
- Conceptualizing brain injuries (such as concussions) requires thinking outside the box and incorporating multiple neuroimaging measures, including CT scans and MRI.

TBI calls for new and different ways of conceptualizing brain injuries. This is due to the different severity levels of traumatic brain injury (mild, moderate, severe, penetrating), as well as the location of injuries and their functional consequences. When assessing traumatic brain injury, MRI can be uniquely helpful if it is thoughtfully used in conjunction with other measures such as CT scans. For example, MRI can be helpful in determining the injury levels of TBI, describing the populations of TBI patients by injury level and diagnostically predicting TBI. In distinguishing between populations of TBI patients, one diagnostic discriminator of TBI that is useful is MRI signal intensity ratios. A recent research finding is that MRI can detect acute dural enhancement in mild TBI cases that may be missed on other measures such as CT scan.

Neuroimaging of TBI

Gerard Riedy, Ph.D., M.D., Chief of Neuroimaging, National Intrepid Center of Excellence

- Approximately 80 percent of traumatic brain injuries are categorized as mild, and often exhibit normal MRIs.
- Of the 66 percent of patients who had positive findings of TBI at the National Intrepid Center of Excellence, 37 percent had prior negative MRIs, which indicates that not all MRIs are equal.

TBI often results in functional deficits, yet the most commonly used methods of neuroimaging are limited because they assess brain structure. To address the limitations of routine neuroimaging, the National Intrepid Center of Excellence (NICoE) has developed and implemented advanced neuroimaging protocols. At NICoE, a state-of-the-art image-processing lab has been built, with the goals of determining the most effective methods for imaging and evaluating TBI patients, identifying objective measures of TBI severity and correlating findings with clinical symptoms and outcomes. This is being accomplished by integrating MRI and functional MRI (fMRI), PET and MEG imaging. Advanced magnetic resonance imaging may be the best method for objectively diagnosing and evaluating TBI.

Patients at NICoE typically have had multiple deployments, been injured from single or multiple explosions and exhibit chronic TBI. For many, a long period has elapsed since injury. Of the 66 percent of patients who had positive findings of TBI at NICoE, 37 percent had negative prior MRIs, which indicates that diagnostic detection of TBI using MRIs is commonly not effective. To fully assess the service member's condition, the neuro-comprehensive exam at NICoE is more thorough and uses multimodal images of diffusion tensor imaging (DTI), MRI, and other forms of imaging to determine the nature of the problem. NICoE has taken over 41,000 images of service members with possible TBI, with the goal of accurately assessing the injuries that they incurred in military service. Added to their ongoing patient focus, NICoE is taking part in the Common Data Elements project, a NIH/Defense Department initiative to standardize radiology reports of neuroimaging results, outcome measures, demographics and biomarkers to help enable meta-analysis and develop effective treatments.

Friday Afternoon Breakout Sessions

Psychological Health

Use of Psychological Health Clinical Support Tools (CSTs) to Improve Psychological Health Care: Existing Psychological Health CSTs for Depression, Substance Use Disorder and Posttraumatic Stress Disorder

Miguel Roberts, Ph.D., Psychological Health Clinical Standards of Care, Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE)

- Dr. Roberts gave an overview of evidence-based treatments focused on PTSD, major depressive disorder (MDD) and substance use disorder (SUD).
- He then provided examples of how tools being developed at the Defense Centers of Excellence can be used to support clinical practice guidelines and improve the delivery of consistent, quality care.

Dr. Roberts started by highlighting the high rate of prevalence of PTSD and comorbid conditions such as substance use disorders and depressive disorders in service members returning from Iraq and Afghanistan. The numbers are high – more than 2.2 million service members have deployed in support of OEF/OIF since 2001 and, of that number, 2.4 percent have been clinically diagnosed with PTSD post deployment. In addition, research suggests that between 10 and 15 percent of service members self-report symptoms consistent with a PTSD diagnosis. These numbers may actually underestimate its prevalence due to the stigma associated with full disclosure of mental health symptoms and the differences in the various studies' sampling and survey methodologies.

Combat-related PTSD also has considerable differences compared with PTSD seen in civilian populations. For one, combat-related PTSD is less responsive to treatment and the emotional reaction is less applicable to service members who are trained and expect combat exposure. Second, access to protective factors is limited due to both the nature of the disorder and the culture of the military. Third, the rate of comorbidity with depression, substance use disorders and mild traumatic brain injury is common. For example, a review of the research shows a rate of depressed combat-exposed service members of between 1 and 8 percent, a higher rate than found in civilian populations. Substance use is also a problem, with heavy drinking showing a statistically significant rise since 2005 and binge drinking increasing from 35 percent in 1998 to 47 percent in 2008, and a significant increase in the non-medical use of opioid prescription medication. There is also a higher rate of PTSD in service members with mild traumatic brain injury, which is significantly higher than in those with no mild traumatic brain injury. There are other aspects of service members' lives that are inordinately impacted by wartime experience and the previously mentioned DSM-listed disorders, including family problems, risky behavior, suicide and general difficulties in adjusting to life.

In addition, studies have shown higher rates of these disorders in National Guard and Reserve forces and, because of geographic dispersion, there are challenges in providing these individuals with adequate treatment.

In response to the increased rates of PTSD and the comorbidities associated with it, DCoE has developed clinical support tools to assist primary care providers in providing the most effective treatment for service members based on the latest research and clinical innovations. The focus is on primary care, because that is where virtually all service members who will require treatment first report symptoms. Dr. Roberts discussed the clinical support tools that his directorate has developed (or is currently developing) for PTSD, depression and substance use that can assist health care providers who are not necessarily trained in counseling methods to provide effective care. All of the clinical support tools contain a similar structure, with information

Friday Afternoon Breakout Sessions

on the most effective screening methods, strategies to take during the clinical encounter, psychotherapies and pharmacotherapies that have the best evidence, patient education materials and a menu of options to offer patients to increase treatment engagement.

Similar to the experience of other innovators at this conference, the rate of using these research-based clinical tools is surprisingly low, a fact that Dr. Roberts said was a reminder that the barrier to improving care is not merely a lack of knowledge. There are numerous systemic and operational factors that do not change easily and make innovation very difficult.

Psychological Health

Acute Psychological Care in Theater: Operation Enduring Freedom Combat Stress Control

Col. Christopher Robinson, M.P.H., Ph.D., Deputy Director, Psychological Health Clinical Standards of Care Directorate, Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE)

- This presentation focused on the actual provision of behavioral health services in theater and some of the obstacles and opportunities that exist in that environment.
- Information was provided on the nature of the presenting problems, effective tactics for working with service members, and ways to successfully implement some of DCoE's best practices in actual combat settings.

Military psychological health encompasses more than simple mental health care. It affects command strength and unity, military readiness, community wellness and medical outcomes. These factors are important to address in service members in theater and post-deployment. Exposure to combat increases the risk for mental health conditions such as PTSD, depression and substance use disorders, and while some symptoms have survival value in combat (e.g., hyperarousal and hypervigilance), they can also become incapacitating and interfere with psychological adjustment after returning home. The length and number of deployments can also heavily influence the onset of psychological health conditions and affect important social factors such as an increased divorce rate and significant marital issues related to deployment.

Col. Robinson described the combat stress control (CSC) model of addressing military psychological health in theater. It is similar to the traditional chaplain model in that the providers are forward deployed and attached to the units. It requires all providers to be qualified to travel throughout the theater. The goal is to keep service members in the fight and provide outreach to combat platoons with the highest levels of combat. Although traditional behavioral health services are provided as part of the CSC model, it has a strong prevention focus in that it treats many presenting problems seen in theater as a normal reaction to abnormal conditions. Rather than pathologizing a stressful reaction to combat, the CSC model provides approaches that help to restore service members' fitness for duty and assist commands in reducing the incidence of stress reactions. Several services are provided by CSC: evaluation/treatment of behavioral health disorders, intervention with Combat & Operational Stress Reactions (COSR), mild traumatic brain injury screening, Military Acute Concussion Evaluation (MACE), command consultation, traumatic event management, outreach/prevention throughout the area of operations and briefings/classes (e.g., anger/stress, sleep, warrior resilience and relationship enhancement).

Col. Robinson described the CSC caseload in Afghanistan. Although most of the encounters involved COSR, there were a significant number of behavioral health cases (see Figure 39). The operational tempo was high – all of the encounters were handled by 26 providers. The usual presenting combat stress reactions included:

Friday Afternoon Breakout Sessions

dealing with combat exposure, non-combat-related trauma exposure, peer/unit problems, leadership issues, home front issues, mission-related issues, environmental issues and interpersonal conflict. Combat exposure (27 percent) and issues related to the home front (20 percent) were the largest. Behavioral health diagnoses were also treated, with the most commonly treated being Axis I diagnoses that existed prior to combat exposure (26 percent), depression (13 percent), and anxiety disorders (10 percent).

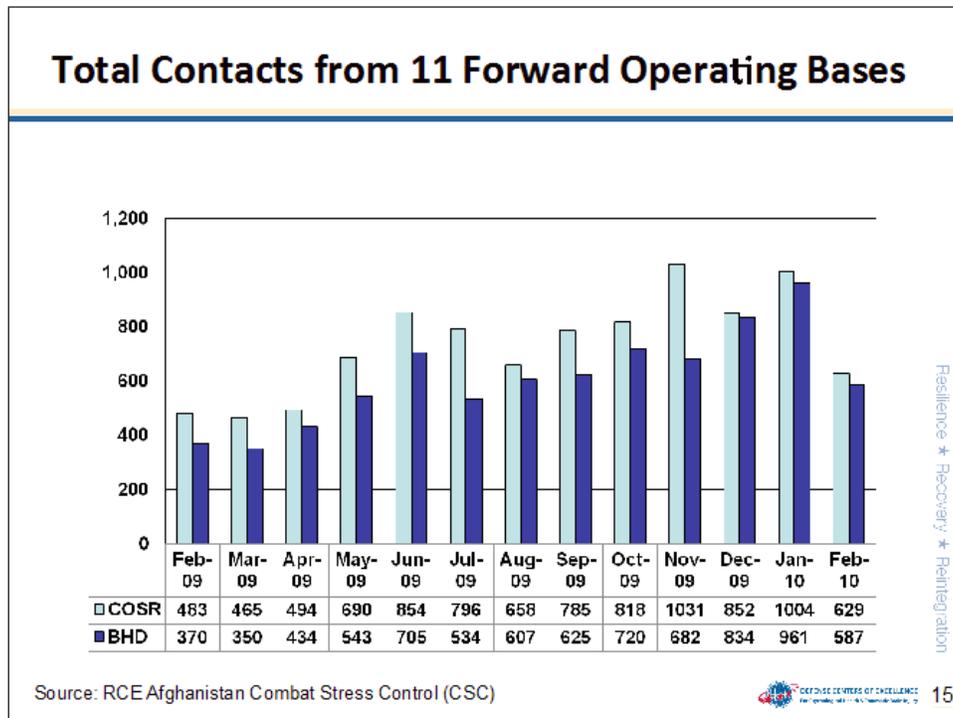


Figure 39. Data showing how the CSC model can increase service member clinical contact.

The CSC model was successful in preserving service member fitness. The overwhelming majority of service members were returned to duty without limitations, and those returned with limitations were usually due to transient aggression or suicidal ideation, and the only limit to their function as a service member was confiscation of their firing pin for a short time. This allowed for safety but prevented stigma that would come from having a firearm confiscated in a combat environment (see Figure 40).

Friday Afternoon Breakout Sessions

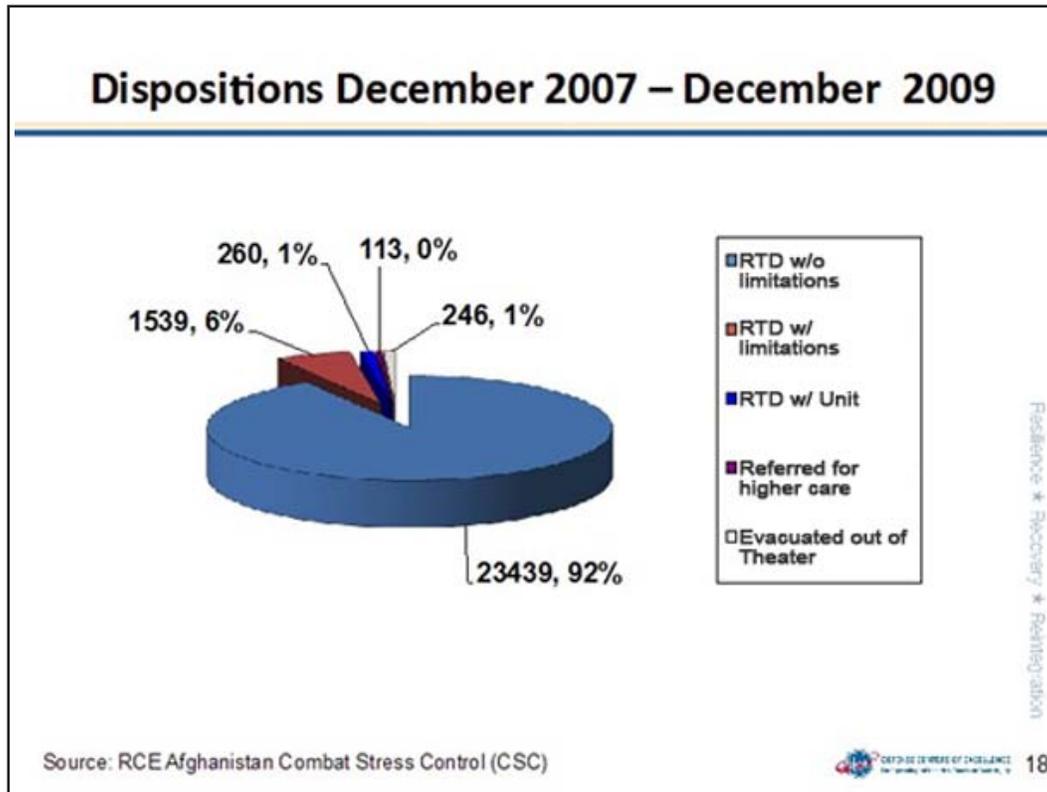


Figure 40. Disposition for service members seen at a CSC in theater.

A critical part of the CSC model was what Col. Robinson called “walk about contacts.” These amounted to CSC mental health care providers going outside the clinic and interacting with service members in ordinary ways (e.g., watching football, exercising, etc.). In this way, they were able to lower the barrier to contact with a mental health professional and provide simple and easy answers without the stigma associated with coming in for a behavioral health appointment. This allowed CSC staff to provide helpful assistance in a low-key manner and reduced the need for service members to schedule a formal treatment encounter.

There were challenges to this form of treatment that included: privacy/confidentiality when integrated into units; leadership over-sensitivity to psychological health issues; providers being seen as a command “outsider”; continued exposure to traumatic stimuli; service member overuse of caffeine, nicotine, performance enhancement stimulants and supplements; and a fluctuating environment of boredom or terror. In closing, Col. Robinson suggested a set of areas to address and specific next steps such as decreasing variations in behavioral health care, implementing effective sleep hygiene techniques, expanding programs of embedded behavioral health providers, standardizing nomenclature, establishing training and procedures for administering psychological first aid, training more providers in complementary and alternative medicine, providing better and tighter pre-deployment standards and encouraging behavioral health collaboration with line leadership.

Friday Afternoon Breakout Sessions

Psychological Health

PTSD Prevention: Lost in Translation from Bench to Bedside

Meena Vythilingam, M.D., CDR, USPHS, Director, Psychological Health Clinical Standards of Care, Defense Centers of Excellence (DCoE)

- This presentation summarized the latest research on efforts to prevent the development of acute stress disorder (ASD)/PTSD in service members exposed to combat.
- The presentation contained three main sections – “bench” research on the physiology of the acute response to trauma and how it leads to ASD and PTSD, “bedside” clinical studies or actual medication or psychotherapy techniques used to treat ASD/PTSD and the overall conclusions from these reviews. The presentation was unique in that it focused on the prevention of ASD/PTSD and not their actual treatment.

Dr. Vythilingam reviewed the bench research that outlined the stress responses impacted by ASD and PTSD. Three physical areas were discussed: (1) the anterior cingulate cortex and medial pre-frontal cortex, which provide inhibition and extinction, (2) the amygdala, which processes threats and fear conditioning, and (3) the hippocampus, which processes memory and past experience. In addition, research has demonstrated how the sympathetic nervous system (SNS) and the hypothalamic-pituitary-adrenocortical (HPA) axis control the neural and endocrine responses to stress, respectively. There is solid research on the locations and mechanisms of the stress response and the effects that trauma exposure has on them. For example, research indicates that adrenergic response levels at the time of trauma can predict follow-on PTSD, and bench experiments to alter those processes have been effective (e.g., propranolol, morphine). However, “bedside” experiments done with service members suggest that these interventions, while effective in animal models or in a laboratory setting, are ineffective in patient populations. Other research findings have demonstrated the ability to prevent the development of PTSD, but they involve impractical solutions such as a moderate-to-high level of alcohol intoxication at the time of trauma. Finally, drugs that research suggests would be helpful in preventing the development of ASD or PTSD such as benzodiazepines are not effective and can worsen the prognosis. Finally, drugs that are approved for treating PTSD (e.g., escitalopram) are shown in studies to be ineffective in preventing the onset of the disorder (see Figure 41).

Friday Afternoon Breakout Sessions

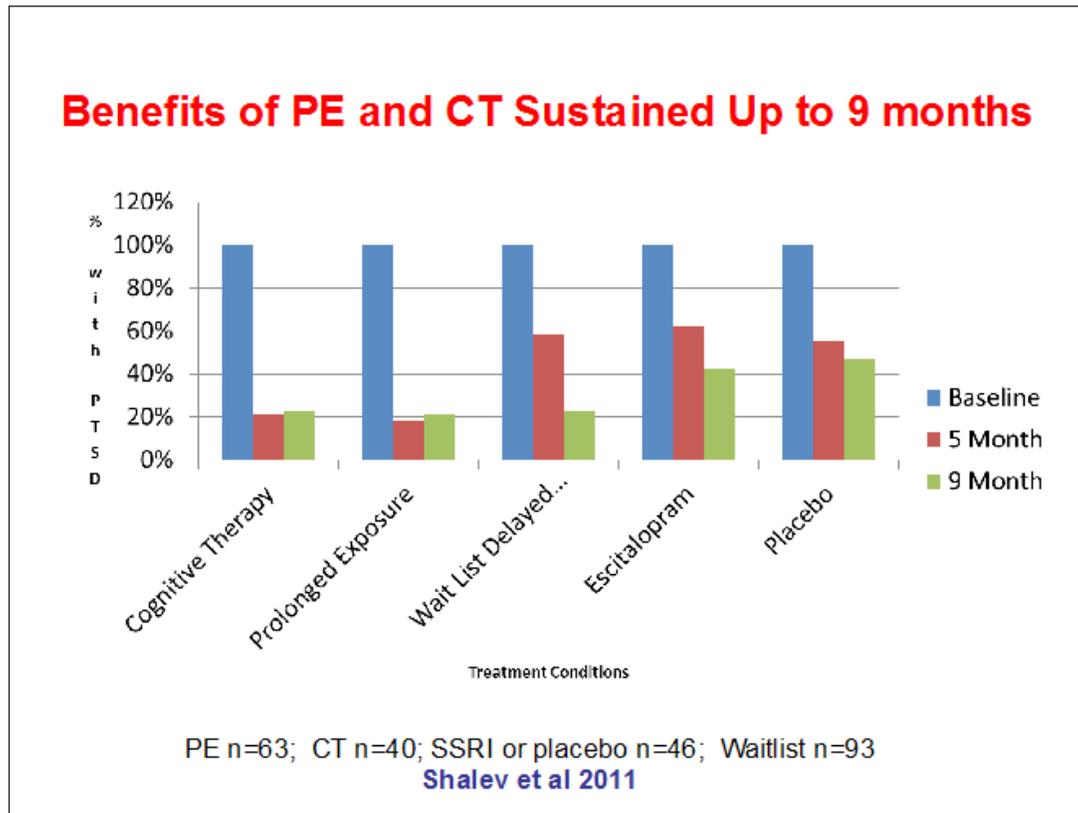


Figure 41. Data from Shalev et al.'s study on early preventative treatments for PTSD.

On a more optimistic note, there are evidence-based psychotherapies that studies show are effective in treating PTSD, in particular prolonged exposure and the trauma-focused cognitive behavioral therapies such as eye movement desensitization and reprogramming (EMDR), meditation and cognitive reappraisal. In a reversal of translation, researchers have explored the changes that happen in the brain as a result of treatment with those therapies and have found that they have an inhibitory effect on the amygdala and serve to activate sections of the pre-frontal cortex that act to inhibit stress responses.

In treating service members within 4-30 days of their having experienced a traumatic event, there is inconclusive evidence to support proactively treating PTSD or ASD with medication or psychotherapy. It is recommended to intervene only to promote (1) safety, (2) a calm environment, (3) consultation with the service member's leadership and (4) reconnection with their unit, which is a strong social connection while on deployment. Consistent with Roberts et al's 2009 Cocraine Review, providing trauma-focused cognitive behavioral therapy without a full diagnosis is ineffective and can be harmful for some individuals. A grid of treatment recommendations based on research is provided in Figure 42.

Friday Afternoon Breakout Sessions

Early Intervention: 4- 30 Days After Trauma Exposure				
Balance of Benefit and Harm				
SR	Significant Benefit	Some Benefit	Unknown Benefit	No Benefit
A	- Brief Cognitive Behavioral Therapy (4-5 sessions)	Highly recommend		
B				
C		- Social support		
D			Do Not recommend	- Individual psychological debriefing ☹ - Formal psychotherapy for asymptomatic survivors ☹ - Benzodiazepines ☹ - Typical Antipsychotics ☹
I	Inconclusive evidence	Psychoeducation and normalization	- Imipramine - Propranolol - Prazosin - Other Antidepressants - Anticonvulsants - Atypical Antipsychotics - Spiritual support - Psychological First Aid	- Group psychological debriefing

☹ Potential harm: SR = Strength of recommendation (see Appendix A)

Figure 42. Grid of treatment recommendations for prevention treatment for PTSD

Cmdr. Vythilingam concluded with four main take-home points on the research on preventing the development of ASD or PTSD 4-30 days after patients have experienced a traumatic event. The first is that despite promising research findings, there is currently no conclusive evidence for medication-based prophylaxis to prevent development of ASD and PTSD that does not impair judgment or functioning or has demonstrated effectiveness outside of trauma that is injury-related (e.g. alcohol intoxication, opioids). The second point is that trauma-focused cognitive behavioral therapy and prolonged exposure are the most effective treatments for PTSD. They have been shown to be effective, and neuroimaging suggests that they can positively alter the mechanisms that pharmacology is attempting to alter. Third, providers should only treat service members who meet the full criteria for ASD or PTSD. The first line of treatment should be rest and support, and premature intervention with evidence-based psychotherapies can impair the natural posttraumatic adjustment that the majority of individuals experience. Fourth, it is never too late to treat an ASD or PTSD diagnosis. Research has shown that those who are provided delayed treatment still significantly improve.

Poster Session Abstracts

Attenuating Exaggerated Fear by Glucocorticoid Treatment in Animal Model of PTSD

Min Jia, Stanley Smerin, Lei Zhang, Xi Xia Li, Robert Ursano, He Li. Henry M. Jackson Foundation for the Advancement of Military Medicine

Activation of central glucocorticoid receptor initiated signaling has been implicated in the pathogenesis of stress-associated psychiatric disorders such as PTSD. To further examine the roles of central glucocorticoid receptor signaling associated with the occurrence of stress-induced psychiatric symptoms, the present study, utilizing a learned helplessness stress model in rats, determined that activation of glucocorticoid receptor signaling before and after stress attenuates stress-induced physical and behavioral abnormalities such as exaggerated acoustic startle response (ASR) and reduced body weight gain. Rats stressed by restraint/tail shock for three days developed an elevated ASR 14 days post stress, as well as reduced body weight in comparison to non-stressed control animals. Administration of corticosterone 30 minutes prior to exposure of the animals to the stress protocol prevented the restricted duration of elevated ASR in a dose-dependent manner. Administration of corticosterone to the animals immediately after exposure to the stress protocol also prevented the subsequent occurrence of exaggerated ASR. These findings suggest a critical role of central glucocorticoid receptor activation in developing the pathophysiology associated with elevated ASR. The differential effects of corticosterone pre and post-stress administrations of ASR and its potential clinical implications, including PTSD, are discussed.

Changes in Reported Symptoms of Subjects Presenting in an Acute Clinical Setting Followed for 90 Days

Martin Cota, Jessica DeStefano, Mary Rucker, Genevieve Jacobs, Veronica Sudekem, Marcus Dean, Anita Moses, Joanna Shay, Katherine Williams, Lawrence Latour. Henry M. Jackson Foundation for the Advancement of Military Medicine

Patients presenting with head injury suffering symptoms consistent with concussion or mild TBI, with or without findings on neuroimaging, may or may not have lasting symptoms. Here we present preliminary data on common symptoms in association with presence of pathology on acute MRI within 48 hours post injury and 90 days (+/- 30) post injury. Seventeen subjects enrolled with suspected TBI presenting in an acute clinical setting completed baseline and 90-day assessments including imaging and Neurobehavioral Symptom Inventory (NBSI). Data was categorized according to findings on research MRI. The number of symptoms reported was presented as a median. Eleven out of 17 showed findings on imaging. Subjects with findings showed a median of four of number of 90-day reported symptoms and a decrease of four in total severity of symptoms, whereas subjects with no findings showed a median of three of number of 90-day reported symptoms and a decrease of one in severity of symptoms. Three out of 11 (27 percent) with imaging findings reported increase of severity of symptoms, median 10. Data collected shows imaging-positive subjects had more symptoms and less decrease in symptom severity. More data is needed to test the statistical significance of symptom fluctuations in association with imaging findings.

Clinical Correlates of Postconcussive Symptoms among OEF/OIF Veterans with a History of TBI

George J. Zeckler, Rebecca Melrose, Zainab Dellawalla, Jonathan Ghiam, Steven Castellon, Ana Okonek, Mark Ettenhofer. USU Department of Medical and Clinical Psychology

The objective of this study was to identify correlates of post-concussive symptoms (PCSx) among OEF/OIF veterans with a history of TBI. Retrospective record review was conducted for a consecutive group of OEF/

Poster Session Abstracts

OIF veterans with TBI who completed a neuropsychological assessment in the West Los Angeles Polytrauma Program between 2006 and 2009 (n = 59). Correlations of PCSx (Neurobehavioral Symptom Inventory total score and somatic, cognitive and affective subdomains) with self-report measures of mood (BDI), anxiety (BAI) and PTSD (PCL-M) symptoms, objective neuropsychological performance and medical characteristics were examined. Higher self-reported PCSx were most strongly related to mood, anxiety and PTSD symptoms. Similarly, PCSx were elevated among patients with prescriptions for psychiatric, sleep or pain medications. Additionally, cognitive PCSx were related to objective measures of learning and recall and somatic PCSx were higher among patients with service-related musculoskeletal injury. Among treatment-seeking OEF/OIF veterans with a history of TBI, PCSx appear to be strongly related to affective symptoms and a number of other factors aside from TBI characteristics. Along with assessment of neurobehavioral symptoms, clinicians should evaluate psychiatric symptoms and other potential causes of PCSx when treating patients with a history of TBI.

Development and Validation of the Telecaps

Brian P. Marx, May S. Chen, Christina Hatgis, Michelle Bovin, Molly R. Franz, Shoyun C. Han, Paola Rodriguez, Denise M. Sloan. National Center for PTSD

Research has increasingly focused on providing evidence-based treatment of PTSD via teleconferencing methods, but few studies have explored the efficacy of a telehealth assessment of PTSD. The current project examined the reliability, validity and feasibility of a telehealth administration of a structured diagnostic interview, the Clinician-Administered PTSD Scale (teleCAPS), to assess PTSD among veterans. Twenty-four veterans from various conflict eras were administered the CAPS via videoconferencing technology with a clinician located in either a VA hospital or in a community-based outpatient clinic. Participants were then asked to complete several questionnaires. Additionally, 12 participants received face-to-face CAPS to obtain an estimate of inter-rater reliability. Overall, PTSD severity from the face-to-face CAPS significantly correlated with overall PTSD severity from the teleCAPS ($r = 0.84$, $p < 0.01$). Both versions of the CAPS were highly correlated with a self-report measure of PTSD ($r = 0.81$, $r = 0.74$); these associations were not significantly different from each other ($p > 0.05$). Test-retest reliability indicated excellent agreement between the CAPS and teleCAPS examiners ($\kappa = 0.75$). Finally, veterans indicated high overall satisfaction with the teleCAPS. Preliminary results support the utility of videoconferencing technology to provide effective assessment of PTSD.

Differences in Neuropsychological Performance and Symptom Presentation Based on Clinician Symptom Attribution

*Laura Boxley, Brigid Waldron-Perrine, Julie Alberty, Percival Pangilinan, Linas Bieliauskas
VA Ann Arbor Healthcare System*

The assessment of potential TBI presents many challenges, including characterization of ongoing neurological, psychological and behavioral symptoms. The purpose of the current study was to examine the contribution of TBI and behavioral disturbance (e.g., pain, psychiatric conditions) to current functioning in a veteran population. A neuropsychological test battery was administered to 376 consecutively referred veterans (age 31.2 [0.6]) within a VA polytrauma clinic. Among other standardized measures of cognitive, psychological and behavioral functioning, veterans were given the Neurobehavioral Symptom Inventory, Trails A & B, WAIS-IV Digit Span and Insomnia Severity Index. Clinical evaluation by a physician was used to characterize each patient's symptoms as attributable to one of the following: TBI, behavioral disturbance, both TBI and behavioral disturbance, "other" diagnosis or symptom resolution. One-way ANOVA was used

Poster Session Abstracts

to compare group performance across measures. Those diagnosed with behavioral disturbance alone or TBI and behavioral disturbance consistently performed more poorly on measures of psychomotor speed, simple attention and set—shifting than the TBI-only group. These individuals also endorsed more severe post-concussive symptoms and greater sleep disturbance. Although TBI and behavioral disturbance can independently impact cognitive functioning, the synergistic effect of concurrent symptomatology may result in greater deficits.

Diffusion Tensor Imaging Atlas-Based Analyses in Major Depression after Mild Traumatic Brain Injury

Vani Rao, Miekle Mielke, Gwenn Smith, Una McCann, Alyssa Bergey, Dzung Pham, David Yousem, Susumu Mori, Johns Hopkins University

There are currently no early neuroanatomical markers associated with the onset of major depression or depressive symptoms after mTBI. A one-year longitudinal pilot study was conducted to determine whether diffusion tensor imaging (DTI) measures of fractional anisotropy (FA) and mean diffusivity (MD), collected within one month of mTBI could predict incident depression. Of the 14 subjects who met the study criteria, four (28.6 percent) developed major depression during the follow-up. Compared to the non-depressed group, those that developed depression had reduced FA in the left superior temporal gyrus ($p=0.03$). In addition, greater depression severity was associated with lower FA in the left superior and middle temporal gyri and with higher MD in several fronto-temporal regions. These results suggest that white matter microstructural abnormalities as assessed by DTI in the early mTBI period have the potential to serve as prognostic markers for the development of major depression and depressive symptoms in the first year post-TBI. These results need to be replicated in a larger sample.

DTI and Tractography of Military-related Traumatic Brain Injury

Ping-Hong Yeh, Binqun Wang, Terrance R. Oakes, Haiying Tang, John Graner, Hai Pan, Wei Lui, Lous M. French, Col. Fletscher Munter, Gerard Riedy NCIRE San Francisco

TBI accounts for the majority of explosive blast injury and combat casualties in OEF/OIF. We applied automated probabilistic reconstruction of major white matter pathways on diffusion tensor imaging data to evaluate the white matter (WM) changes of TBI in military-related injury. Participants included 32 documented TBI (27 male, five female; 25 mild, seven moderate; 17 blast injury, 15 non-blast trauma, age 26.7 ± 3.7 years, 344.4 ± 528.9 days from injury) and 13 healthy controls (HC, four females, eight males, age 26.2 ± 5.4 years). Major WM pathways were segmented by incorporating prior information on the anatomy of the pathways from a set of training subjects. Fiber tracts volume, length and diffusion tensor-derived diffusive measures were used to evaluate group difference between TBI and HC after taking gender and age effects into account. TBI patients as a group had lower fiber volumes in left superior longitudinal fasciculus, both parietal and temporal bundles than HC, but no significant group difference of average diffusive measures was found. Military TBI subjects likely have heterogeneity of brain changes due to various mechanisms of injury. The sensitivity of detecting WM microstructural changes in TBI can be improved by incorporating diffusion tractography results.

Eye Tracking Assessment of Mild Traumatic Brain Injury: A Pilot Study of the Bethesda Eye and Attention Measure (BEAM)

David M. Barry, Doug Girard, Dmitry Mirochnitchenko, George Zeckler, Lindsay Reinhardt, Mark Ettenhofer. USU Department of Medical and Clinical Psychology

Poster Session Abstracts

Eye tracking has been shown to be sensitive to mild TBI, but little is known about the neurocognitive mechanisms underlying abnormal eye movements. Our laboratory designed the Bethesda Eye and Attention Measure (BEAM) to identify potential abnormalities in neurocognitive control of eye movements in mild TBI. The BEAM is a continuous performance test requiring oculomotor and manual responses to target stimuli. Several unique trial types, each eliciting different aspects of attention, speed and executive functions, are presented pseudo-randomly. We used an ASL High-Speed D6 remote eye tracker to record eye movements and determine visual and manual reaction times (RT) for each trial. Eleven participants without history of head injury were included in the pilot study. The BEAM was well tolerated by participants and demonstrated good reliability for visual RT ($\alpha=.95$). Large within-subject effects for orienting/predicting ($d=1.52$), gap ($d=1.17$), timing/alerting ($d=.92$) and interference ($d=.96$) were found for visual RT. These data provide preliminary evidence that the BEAM is able to reliably measure and differentiate multiple neurocognitive processes. Future studies of individuals with and without TBI will be conducted to standardize the BEAM and identify profiles of performance associated with TBI and commonly comorbid conditions.

Evidence for Team: A Post Deployment Psychological First Aid-based Education Program for U.S. Army Mortuary Affairs Soldiers

Quinn M. Biggs, Carol S. Fullerton, Christine Gray, James McCarroll, Col. David M. Benedek, Lt. Cmdr. Patcho Santiago, Robert Ursano USUHS

U.S. Army Mortuary Affairs Soldiers (MA) who serve in Iraq and Afghanistan are at high risk for post-deployment psychological distress and psychiatric disorders. A new educational intervention, Troop Education for Army Morale (TEAM), is designed to reduce distress and foster adaptive functioning. TEAM is based on evidence-informed principles of psychological first aid and delivered through workshops, handouts, a website and phone line. Soldiers learn to use self-care skills, provide support (buddy care) and identify barriers to care. MA Soldiers, randomized to TEAM or no intervention, complete questionnaires upon return from deployment and at one, two, three, six and nine months. TEAM workshops are held at one, two, three and six months. At one month post-deployment, probable PTSD and probable depression were 27.8 percent and 24.5 percent, respectively; health risk behaviors were high (23.1 percent drank more alcohol than usual, 31.5 percent increased tobacco use); and barriers to seeking mental health care were considerable. On average, TEAM was rated as helpful in important coping areas (recognizing problems, connecting and communicating with others, seeking help, feeling safe and using calming techniques to reduce arousal). Implications include the feasibility of early intervention with all military service members, first responders, disaster workers and others exposed to the dead.

For US Combat Veterans of OEF/OIF Who Sustained Mild Traumatic Brain Injury with Loss of Consciousness in Combat, the Prevalence of Neurological Deficits and Post Traumatic Stress Disorder Correlated with the Number of Episodes of Loss of Consciousness

Robert L. Ruff, M.D. VA Cleveland Healthcare System

The objective of the study was to evaluate relationships of episodes of mTBI with the prevalence of PTSD and neurological deficits (NDs). Repeated episodes of civilian mTBI correlate with increased residual neurological deficits. TBI is a common injury among OEF/OIF veterans. PTSD is frequently associated with combat mTBI. The relationship between mTBI and PTSD is unclear. From 2,091 OEF/OIF veterans sequentially screened

Poster Session Abstracts

for TBI with the final step being a detailed physician examination, we identified 126 OEF/OIF veterans who sustained mTBI in combat with loss of consciousness (LOC). Neurological examination included a quantitative test of olfaction. We assayed PTSD severity with the PCL-M. Among the veterans who sustained LOC, 73 percent had > 1 episode of mTBI with LOC, 52 percent had NDs and 66 percent had PTSD; 50 percent had PTSD and a ND. The prevalence of a ND or PTSD correlated with the number of TBI exposures with LOC. The prevalence of a ND was 93 percent for greater than five episodes of LOC. All veterans with five or more episodes of LOC had PTSD. Repeated episodes of combat mTBI increase the likelihood PTSD and a ND. Altered cognition following mTBI may increase the likelihood that a traumatic event results in PTSD. Alternatively, the events associated with mTBI may themselves predispose to PTSD.

Functional Measures as a Strategy to Detect Feigned Neurocognitive Deficits

Leila Rodriguez, Robert Stegman, Wesley Cole, Cristobal Berry-Caban. Womack Army Medical Center

There is a growing body of literature regarding feigned cognitive impairment. Neurocognitive assessments should use multiple freestanding and embedded measures to assess credibility of data and there is a need to expand the available repertoire of such assessment methods. Eighty-four neuropsychological assessments from a mTBI clinic were reviewed to explore the strategy of using low scores on functional measures (FM) as a method to detect non-credible presentation. At least five performance validity measures (PVMs) were administered. Data was considered non-credible if four or more PVMs were failed. Percentage of FM scores 1.33 SD below the mean was calculated as the identification variable. ROC analysis was used to identify the cut-off where sensitivity and specificity were maximized. When 20.5 percent of FMs are 1.33 SD below the mean, sensitivity equals 0.690, specificity equals 0.881. The use of aggregate low scores on FMs provides examiners with another strategy for determination of non-credible data. These data are applicable only to an mTBI population. This method should be used with established PVMs and, at a minimum, indicates a need for caution even when other PVMs are within acceptable limits, with acceptable causes for low FM scores ruled out.

Gender Differences in Response to Deployment Among Military Healthcare Providers in Afghanistan and Iraq

Susanne W. Gibbons, Edward Hickling, Scott Barnett, Pamela Herbig-Wall, Dorraine D. Watts. University of Pennsylvania

Because of the growing numbers of females and the critical role of health care providers serving in Afghanistan and Iraq, gender differences from the impact of operational stress in deployed military health care providers were explored. The unweighted study sample selected from the 2005 Defense Department Survey of Health Related Behaviors Among Active Duty Personnel included results from active duty military personnel over the age of 18 years (n=16,146) deployed at least once to Operation Enduring Freedom (OEF) or Operation Iraqi Freedom (OIF) within the past three years (n=1,425) for a final sample consisting of health care officers or health care specialists (N=455). Psychological distress and social relations were explored and compared. Enlisted female health care providers were more likely to be African American (42.3 percent), single (63 percent), representing the greater percentage with significant psychological difficulties (i.e., serious psychological distress endorsement, 11.3 percent; positive depression screen, 32.2 percent). More harmful drinking patterns (AUDIT score 8-15) were found in all female health care providers (enlisted 61.8 percent; officers 76.4 percent) compared with males (enlisted 41.1 percent; officers 67.1 percent). Female health care providers serving in the current military conflicts are reporting significant psychological distress which may adversely impact their performance within the military, in theaters of operations and in their lives at home.

Identifying Potential Biomarkers for Mild Traumatic Brain Injury by Mining Semantic Relations from MEDLINE Citations

Michael J. Cairelli, Han Zhang, Thomas Rindflesch. National Institutes of Health

Because there are no effective diagnostic biomarkers for mTBI, the objective of this study is to create an automated computational methodology to produce a list of potential biomarkers using semantic predications extracted from MEDLINE citations. Methods: The Semantic MEDLINE database was queried for predications previously extracted from MEDLINE with subjects or objects of a non-pharmaceutical chemical type, limited to citations related to nervous system trauma. Predications were organized into a graph and filtered by degree centrality and predication frequency. The resulting predications were verified against the original text and a Pub Med search was performed for each substance to verify its connection to TBI, a serum presence and previous investigations as a TBI biomarker. Results: From the over 50,000 original citations, 26,000 predications were found containing a non-pharmaceutical substance. Filtering the graph with a degree centrality of 50 and a predication frequency of at least two resulted in a graph with 69 nodes, 13 of which were substances. Conclusion: Graphing the identified predications successfully produced a list of candidates for diagnostic biomarkers. This methodology has the potential to guide the direction of future research to maximize efficiency and outcomes in the development of clinically applicable biomarker-based detection of mTBI.

Inflammatory Biomarkers of TBI/PTSD: A Correlative Immuno-histochemical Study

Prasanth Ariyannur, Brandi Benford, David Rhoiney, Pushpa Sharma. USUHS

Acute inflammatory reaction is one of the critical mechanisms centrally involved in the post injury pathophysiology of TBI/PTSD and its recovery. Biomolecules such as intra-cellular signals, structural and enzyme proteins related to cellular inflammation have been implicated as major biomarkers for TBI/PTSD. Peripheral biomarkers reflecting the extent of local injury and the rapidity of recovery process of pathophysiology are poorly correlated from the studies so far because of the multitude of reasons, including unpredictability of barrier interruption and/or other associated systemic non-CNS pathophysiology. Using previously described established models of TBI and PTSD; we pursue a systematic correlative study using a set of cytokine biomarkers involving CNS inflammation following an acute traumatic contusive brain injury with and without PTSD. In a series of study, we identified and compared a set of post-injury cytokine biomarkers showing particular changes in an antibody based micro-array experiments. We compared the results in serum, cerebrospinal fluid and hippocampal homogenates. From the studies we found that there are some specific inflammatory markers that can be pursued for further correlative studies. We compare the expression of these biomolecules using immunohistochemistry in the tissues in above conditions.

Lithium Ameliorates Neurodegeneration, Suppresses Neuroinflammation and Improves Behavioral Performance in a Mouse Model of Traumatic Brain Injury

Fengshan Yu, Zhifei Wang, Flaubert Tchanchou, Chi-Tso Chiu, Yumin Zhang, De-Maw Chuang. NIMH

TBI is one of the leading causes of death from trauma to the CNS; as of now no known treatment effectively mitigates its effects. Lithium, a primary drug for the treatment of bipolar disorder, has been known to have neuroprotective effects in various neurodegenerative conditions. However, it has not been investigated as a post-insult treatment for TBI. To evaluate whether lithium could have beneficial effects following TBI, lithium chloride at a therapeutic relative dose of 1.5 mEq/kg was administered 15 minutes after injury and once daily

Poster Session Abstracts

for up to two weeks. Assessed at three days and three weeks post-injury, lithium treatment was found to reduce lesion volume. TBI-induced neuronal death, microglial activation and cyclooxygenase-2 induction were all attenuated by lithium at three days after injury. As for behavioral outcomes, lithium treatment improved motor coordination in beam-walk tests. Lithium robustly increased serine phosphorylation of glycogen synthase kinase-3 β (GSK-3 β), suggesting that the underlying mechanisms responsible for lithium's protective effects are triggered by increasing phosphorylation of this kinase and thereby inhibiting its activity. Our results support the notion that lithium has heretofore unrecognized capacity to mitigate the neurodegenerative effects and improve functional outcomes in TBI.

MicroRNA as Biomarkers of Mild Traumatic Brain Injury

Anuj Sharma, Raghaven Chandran, Mary Anne Hutchinson, Erin Barry, Nagaraja Balakathiresan, Manish Bhomia, Manoshi Gayen, Min Jia, Amanda Fu, Joseph McCabe, He Li, Neil Grunberg, Radha Maheshwari. USUHS

Mild traumatic brain injury has been described as the signature injury of combat in Iraq and Afghanistan. Here, we describe a mouse mild closed-head injury model where injury was induced in the left hemisphere of the brain just above the lambdoidal suture on the exposed skull by a free-falling metallic weight (246 g and 333 g). Two fall heights, two centimeters and three centimeters, were evaluated for the extent of the injury. MTBI induced loss in body weight in both two centimeters and three centimeters groups as compared to the sham controls. A higher neurological severity score and an attenuation of pre-pulse inhibition in acoustic startle test were observed in injured groups 24 hours after the injury. Altered motor function or learning ability in the injured groups was indicated by reduction in the time spent on rotarod. Open field test indicated signs of depression in animals post injury. Serum microRNA profiles of injured animals showed marked modulation of microRNAs such as mir-134, mir-30e and mir-let 7i post injury.

Missed Diagnosis of Concussion or TBI in Mild Head Injury Patients Presenting to the Emergency Department

Jessica DeStefano, Mary Rucker, Genevieve Jacobs, Matin Cota, Lawrence Latour, Henry M. Jackson Foundation for the Advancement of Military Medicine,

Despite heightened awareness, a diagnosis of concussion or TBI may be underutilized. We examined the frequency of these diagnoses in acute head injury patients. Patients presenting to the ED with minor head injury were enrolled in a study including MRI. History was obtained independent of clinical assessment and used with imaging findings to infer a diagnosis of concussion. Of 86 patients enrolled, none received an ED discharge diagnosis of TBI, 24 of 86 patients (28 percent) received a diagnosis of concussion including 14 of 24 (58 percent) with imaging pathology and an additional 10 had a diagnosis of pathology based on CT imaging. 52 of 86 patients (60 percent) had other diagnoses. Of the 52 patients with other diagnoses, 34 (65 percent) qualified for concussion based on research data including 17 of 34 (50 percent) with imaging pathology. Of the remaining 18 patients, eight had pathology on imaging suggestive of TBI, but did not meet other criteria for concussion. 60 percent of patients presenting with mild head injury did not receive a diagnosis of concussion or intracranial pathology from the ED. From research and imaging data, a large proportion of these patients met criteria for concussion or TBI. This is an opportunity to improve screening and consistency in ED diagnoses.

Neurocognitive Performance of Concussed Soldiers without Loss of Consciousness, Post-Traumatic Amnesia, or Symptoms

Col. Rodney Coldren, Mark Kelly, Robert Parish, Michael Drestch, Michael Russell. USUHS

Defense Department definition of mTBI/concussion requires only that an injured individual experience “an alteration in mental state at the time of injury” (e.g., confusion, disorientation, slowed thinking). There is no requirement for loss of consciousness (LOC), post-traumatic amnesia (PTA) or other symptoms such as headache or blackouts. The broadness of this definition can lead to diagnostic uncertainty in a chaotic environment. The objective of this study is to examine if neurocognitive functioning is impaired in individuals who meet the Defense Department definition of concussion without LOC, PTA, headache, blackouts or confusion. An extensive battery of neurocognitive tests was performed on 66 soldiers deployed to Iraq within 72 hours of an mTBI per the Defense Department definition and on 166 non-concussed controls. Of the concussed soldiers, nine did not have LOC, PTA, headache, blackouts or confusion following the event. None of the neurocognitive tests demonstrated performance impairment of these concussed soldiers when compared with controls. Concussed soldiers who experienced LOC, PTA or one of these symptoms demonstrated significantly impaired function across the majority of tests administered. While the small study size precludes definitive conclusions, research is indicated to examine the appropriateness of such a broad definition of mTBI.

No Evidence of Effect of Deployment Environment or Non-Concussive Injury on Neurocognitive Functioning in Soldiers Deployed to Iraq

Michael Drestch, Rodney Coldren, Mark Kelley, Robert Parish, Michael Russell. USUHS

With as much reliance placed on neurocognitive testing for assessment of mTBI in the U.S. warfighter, there is a need to investigate the impact of potential sources of confounding test results. The objectives of this study were to examine the impact of both deployment and non-concussive injuries on neurocognitive testing results among a group of 166 soldiers with no reported head injuries who were deployed to Iraq. To assess the impact of injury, a battery of neurocognitive tests was performed on healthy controls ($n = 102$) and on soldiers who sustained a non-concussive injury ($n = 62$). Only the delayed recall index of the HVLT-R demonstrated a statistically significant difference ($p = 0.03$). Yet, this variance disappeared once other demographics were controlled. To investigate the impact of deployment itself on neurocognitive functioning, baseline ANAM conducted prior to deployment ($n = 53$) were compared to repeat ANAM testing scores administered in Iraq ($n = 113$). No statistically significant differences were noted on initial compared to repeat ANAM scores based on location of testing. Caution should be used when attributing changes in neurocognitive assessment scores to testing environment or injury alone.

Optimizing Image Contrast in Susceptibility Weighted Imaging

*Ningzhi Li, Wen-Tung Wang, Pascal Sati, Dzung Pham, John Butman.
Henry M. Jackson Foundation for the Advancement of Military Medicine*

By providing excellent susceptibility contrast between blood products and other tissues, susceptibility weighted imaging (SWI) is recognized as a powerful magnetic resonance imaging technique for locating intracranial pathologies, particularly micro-hemorrhages that occur in TBI. In SWI, phase information is combined with magnitude maps to enhance image contrast. Although several phase processing methods have been proposed, no qualitative or quantitative evaluations have been performed to compare them. In

Poster Session Abstracts

this study, several SWI processing approaches, based on two types of homodyne filtering and two phase-unwrapping with filtering methods, were performed and compared on both simulated and real imaging data. SWI results were characterized by (1) contrast to noise ratio (CNR) in regions of interest and (2) mean and standard deviation of phase errors resulting from residual phase wraps. Figure 43 shows how homodyne filtering approaches can be prone to phase errors. Figure 44 shows an example result examining CNR in micro-hemorrhages with different approaches. In the homodyne filtering approaches, higher CNR can only be achieved at the cost of higher phase errors. Phase unwrapping before filtering, although increasing computational complexity effectively eliminates phase errors and offers greater flexibility in filter optimization to improve CNR.

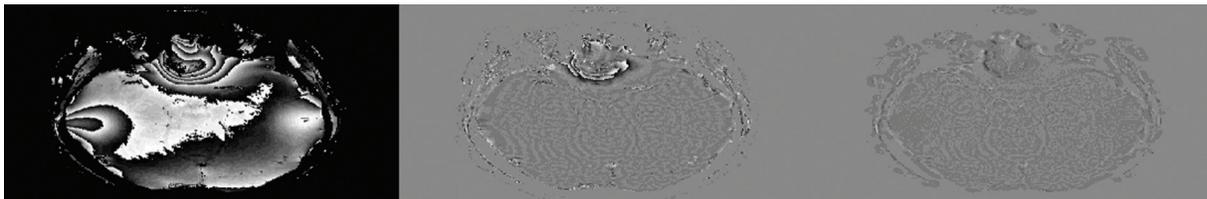


Figure 43 - (Left) Raw phase image, (Center) phase processed with homodyne filter, (Right) phase processed with unwrapping and filtering algorithms.

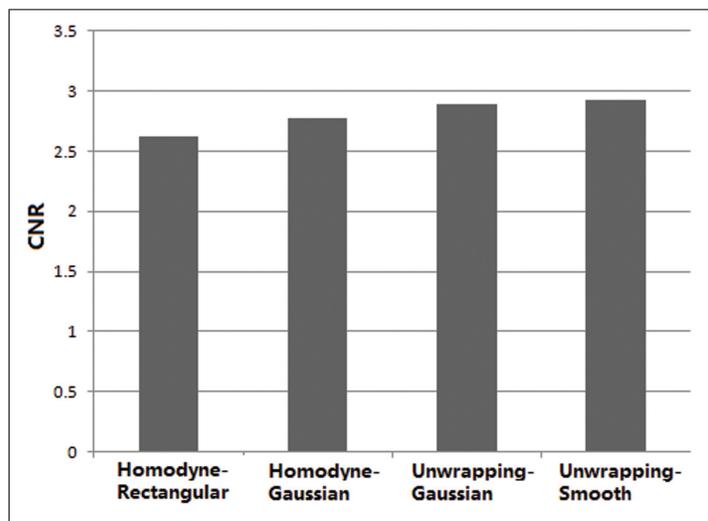


Figure 44. CNR in micro-hemorrhages using four different techniques. Filter parameters were chosen to minimize phase errors while maximizing CNR.

Selective Inhibition of α/β -hydrolase Domain 6 Attenuates Neurodegeneration, Alleviates Blood Brain Barrier Breakdown and Improves Behavioral Performance in a Mouse Model of Traumatic Brain Injury

Flaubert Tchanchou, Yumin Zhang USUHS

The endocannabinoid system has emerged as a promising therapeutic target for TBI. However, the effect of endocannabinoids is transient due to their rapid enzymatic hydrolysis upon secretion. This study seeks to broaden endocannabinoids therapeutic window through the selective inhibition of α/β -hydrolase-domain-6,

Poster Session Abstracts

an enzyme that hydrolyzes 2-arachidonoylglycerol, which is the most abundant endocannabinoid in the brain, using WWL70. Seven-week old, male C57BL/6 mice that sustained moderate TBI by controlled cortical impact on the left parietal cortex were intraperitoneally injected with WWL70 (10mg/Kg) or vehicle starting at 30 minutes post-injury and then once daily for up to 21 days. WWL70 administration improved fine motor movements and motor coordination. Histological staining demonstrated that WWL70 reduced the TBI induced-lesion volume and the number of degenerative cells in the dentate gyrus of TBI mice. WWL70 reduced microglia activation and improved blood brain permeability by reducing the level of ICAM-1. Western blot analysis showed that WWL70 up-regulated the expression of CB1 and CB2, and suppressed the expression of inflammatory markers COX-2 and iNOS. The therapeutic mechanism is seemingly mediated by up-regulation of AKT and ERK phosphorylation. WWL70 effect on several TBI pathological biomarkers is suggestive of its therapeutic potential for TBI management.

SyNAPSe: Study BHR-100-301: A Randomized, Double-Blind, Placebo Controlled Phase 3 Study to Investigate the Efficacy and Safety of Progesterone in Patients with Severe Traumatic Brain Injury

Neta R. Nelson, Thomas MacAllister BHR Pharmaceuticals

Preclinical studies have demonstrated beneficial effects of progesterone as a neuroprotectant for TBI through multiple mechanisms. In three clinical studies conducted in moderate-to-severe TBI, progesterone showed promising improvement in functional outcomes and mortality with acceptable safety. BHR Pharma, LLC is conducting the SyNAPSe Phase 3 trial of BHR-100, progesterone lipid infusion, in severe TBI patients (GCS 4-8). Subjects enter the study following proxy consent, then randomized in a 1:1 ratio of BHR-100 or placebo. Subjects are treated with a loading dose of 0.71 mg/kg/hr of BHR-100 or placebo IV for one hour followed by a continuous infusion of 0.5 mg/kg/hr for a total of 120 hours. The infusion must start within eight hours of TBI. The primary endpoint is the Glasgow Outcome Scale (GOS) at six months post-injury. The study is ongoing in 16 countries in the U.S., Argentina, European Asia, at approximately 100 sites. An interim analysis is planned after 400 subjects (200 per arm) complete the six-month assessment. Completion of the SyNAPSe Phase III study may lead to registration of BHR-100 as the first such drug to have a positive outcome in the acute treatment of TBI patients.

TBI Surveillance in Redeploying Marines

Lt. Jay Haran, Ali Creason, Justin Campbell, Lauren Stentz, Mikias Wolde, Kevin Garcia, Sherry Wing, Cdr. Jack Tsao USUHS

Redeployed Marine units with known high rates of concussion and/or blast exposure were administered post-deployment ANAMs and a post-deployment TBI screening measure. This data was collected from 510 Marines at least 30 days following redeployment in an effort to determine the prevalence of deployment-related TBI and concussion, as well as sequelae and common comorbid symptoms. Of the 510 Marines, 208 were noted to have been formally diagnosed with concussion during deployment. Standardized t-tests were used to compare data for those with and without diagnosed concussion on each ANAM subtest and the ANAM composite score. Differences were observed when baseline and post-deployment ANAM scores were compared. Marines diagnosed with concussion scored significantly lower on the code-substitution delayed ($t = -1.97, p < 0.049$), simple reaction time ($t = -3.04, p < 0.003$) and simple reaction time repeated subtests ($\chi^2 = -3.08, p < 0.002$), as well as on the overall composite score ($t = -2.98, p < 0.003$). Results were suggestive of possible persistent cognitive sequelae secondary to concussion. Implementation of post-deployment ANAM

Poster Session Abstracts

testing may be useful in identifying concussion-related cognitive deficits and necessary areas for remediation to facilitate fitness for return to duty.

TMA/DCoE Resilience and Prevention Study: The Effect of Interpersonal Aggressive Ideation on Post-deployment Behavioral Outcomes in OEF/OIF Service Members

Colando Cato, Melissa Fraine, Alissa Fujimoto COSMOS Corporation

The study examines the responses of the aggressive interpersonal ideation and negative behavioral outcomes. Service members who were deployed at least once between 2007-2009 and completed the Post-deployment Health Assessment (PDHA) and Post-deployment Health Reassessment (PDHRA) were included in the study population. K-means cluster analysis was employed to match service members who endorsed aggressive ideations items to those who did not endorse such items. Bivariate odds ratios and adjusted odds ratios were calculated to evaluate the relationship between aggressive ideation and specific behavioral health outcomes. Service members who endorsed aggressive ideation on the PDHA were more likely to separate from the military due to behavioral or criminal misconduct than those service members who did not endorse aggressive ideation on the PDHA. Those who endorsed aggressive ideation on the PDHRA were more likely to be diagnosed with a substance abuse disorder and more likely to separate from service due to behavioral/criminal misconduct. Early intervention services offered to members who endorse aggressive ideation on the PDHA/PDHRA may prevent subsequent development of substance use disorders and potentially reduce attrition related to behavioral/criminal misconduct. Results are further discussed in the context of combat related trauma and the relationship between this variable, aggressive ideation and post-deployment substance misuse.

TMA/DCoE Resilience and Prevention Study: The Impact of Positive Family Relationships on Post-Deployment Resilience in OEF/OIF Service Members

Colando Cato, Melissa Fraine, Alissa Fujimoto COSMOS Corporation

Although research has identified a range of mission-related stressors with consequences on post-deployment health, there is a critical research gap in the literature addressing the resilience of OEF/OIF service members. This study aimed to determine the demographic factors that predict resilience in the six months following deployment as part of OEF/OIF. We conducted a retrospective data review of 160,040 service members who were deployed at least one month during their military tenure between 2007-2009, exposed to combat while on deployment and reported information about their family relationships and their mental health, behavioral or career outcomes of interest. Combat-exposed service members with a spouse/dependent were more likely than those without a spouse/dependent to have a mental health encounter six months post-deployment. Yet, married service members or those with dependents were less likely to have a substance abuse problem or to be separated from the military for behavioral conduct. Spousal/dependent presence does not appear to be a protective factor from post-deployment development of PTSD or depression. However, spousal/dependent presence may be a protective factor in the development of substance abuse problems or separation from service due to criminal/behavioral misconduct.

Poster Session Abstracts

The Impact of Deployment on Families: The Family Foundations Study

*Jennifer J. Vasterling, Amy Lawrence, Casey Taft, Molly Franz, Helen MacDonald, Susan P. Procter
VA New Orleans Healthcare System*

The study examines the effects of the development and maintenance of PTSD on the psychosocial functioning of families of OIF veterans; (2) determines the extent to which soldier/veteran characteristics (e.g., TBI, pre- deployment functioning), family characteristics and environmental factors (e.g., available social support) interact with soldier/veteran PTSD in their impact on the family. Primary data collection (phone interviews, mail surveys) on the psychosocial outcomes of the family members (spouse/partners, children) of 60 Army soldiers/veterans who previously deployed to Iraq and for whom archival longitudinal psychological data, including baseline PTSD assessment, is available from our prior research. The study is ongoing, but preliminary data (11 soldiers/veterans; eight partners) indicate that 40 percent of soldiers/veterans meet criteria for PTSD. Eighty percent of soldiers/veterans were still in the military. Soldiers/veterans and partners reported average levels of social support and both reported elevated levels of soldier/veteran-perpetrated psychological aggression. One-half of partners also described the soldier's/veteran's work as interfering with home life. Soldiers/veterans reported somewhat higher levels of family satisfaction (45th percentile) than partners (30th percentile). Because the study is ongoing, discussion will center on innovative aspects of the methodology, descriptive data and relevance to new VHA policies regarding family services and outreach.

Use of Virtual Reality for Balance Retraining in a Service Member with Mild Traumatic Brain Injury

Barri Schnallandrea Mahon DVBIC

Conventional rehabilitation for service members with TBI focuses on neuromuscular re-education, balance and coordination-specific therapeutic exercise and gait training. The Neurocom is often used to gauge progress. The Computer Assisted Rehabilitation Environment (CAREN) allows the use of virtual reality (VR) to be incorporated into balance re-training for service members who have sustained TBI. A retrospective chart review was conducted on one 28-year-old patient with TBI who participated in balance re-education in the CAREN. Progress was measured by Neurocom testing and achievement of virtual environment specific goals. Over 19 weeks, this patient demonstrated improvements in Neurocom testing as well as CAREN outcomes. The reaction time for the Sensory Organization Test improved from 1.14 seconds to 0.73 seconds where under 0.8 seconds is within normal limits. Time to complete a CAREN application improved by 44 percent accordingly. There was a positive change between start and end point scores. It is not clear from this data what outcomes may best correlate with VR training. Further investigation of the efficacy of the CAREN training is warranted for this patient population. A prospective study could validate this training method and provide treatment recommendations for patients with TBI.

Summary and Take Home Points

SUMMARY

This year's Trauma Spectrum Conference (TSC) advanced the state of excellence in the treatment of psychological health and TBI by "bridging the gap" between research and practice among our nation's service members, veterans, and their families. At this conference, approximately 570 participants learned about the effective treatments currently available and the exciting research developing future interventions. The presenters brought an objective, credible and collaborative approach to the research, evaluation, and dissemination of treatments for PTSD, TBI and related disorders. Their presentations were current and relevant, and focused on either promoting collaborative research, disseminating evidence-based practices, or informing attendees of the latest research in this area. In addition, attendees were provided with numerous resources that allow them to immediately implement the information presented into clinical practice. A CD toolkit was given to all who came to the conference, and it contained over 150 links to clinical practice guidelines, education/training resources, patient educational material, and research summaries/resources. This year's Trauma Spectrum Conference followed CAPT Hammer's three mandates outlined in his introductory speech: (1) promoting concrete efforts to shorten the time from "bench" to "bedside" with presentations outlining clinically relevant research, breakout sessions that allowed providers and researchers to interact, and a CD toolkit with a wide range of research-based clinical resources that providers can immediately put into practice; (2) taking on the challenge of systemic change with numerous presentations on actual dissemination/implementation projects; and (3) keeping the patient first by selecting presenters that provided information with a strong clinical focus.

CONFERENCE TAKE-HOME POINTS

This year's conference brought to light several factors to help military medicine develop and provide effective treatments for our wounded warriors:

- All forms of intervention and treatment should investigate the use of technologies presented at this year's conference. A leading characteristic of these developing technologies is their adaptability and flexibility in the information they can provide/record and their around-the-clock ability to monitor or advise patients and their providers. Whether mobile apps, web-based therapies, or cloud-based multi-site data collection efforts, technology is revolutionizing how treatments are developed, provided and refined.
- Behavioral health treatment for the Iraq and Afghanistan cohort needs to address the numerous overlapping symptoms with which they present, and integration of the treatment of each separate condition is much more effective than separate, "siloed" treatments. The research presented at this year's conference suggested that future treatment developments should maximize the coordination of care, and current treatment programs should make efforts to increase collaboration with the different programs involved in their patients' care.
- Bridging the gap from research to practice is a perennial issue, and it is essential that future conferences continue to foster dialogue between researchers, administrators and clinicians.

Summary and Take Home Points

Technology transfer has always been an inherently challenging issue, but numerous presenters demonstrated how it can be done successfully. A consistent theme in all of the presentations was that a dogged persistence is essential to successfully implementing the systemic and individual changes needed to more effectively care for service members and veterans. A consistent effort to improve technology transfer by centers of excellence, grant funding organizations and policy makers will make sure that the hard fought advances continue to be made.

In conclusion, there is no more effective forum than conferences like this one to inform practitioners of developing treatments and provide ways to improve care. The Trauma Spectrum Conference is particularly well-suited to doing this by bringing together leaders in military and civilian medicine, telemedicine and technology, and clinicians involved in the research, development and evaluation of best practices.

Trauma Spectrum Conference CD Toolkit List

The 4th Annual Trauma Spectrum Conference

Bridging the Gap Between Research and Clinical Practice of Psychological Health and Traumatic Brain Injury: Prevention, Diagnosis, Treatment and Recovery for the Iraq and Afghanistan Cohort

Dec. 8-9, 2011

Natcher Conference Center, National Institutes of Health
Bethesda, Md.



Trauma Spectrum Conference Toolkit

DCoE Resources for TBI

- [Department of Defense ICD-9 Coding Guidance for Traumatic Brain Injury](#)
- [Discover the Five Things you Need to Know about Concussion](#)
- [Mild Traumatic Brain Injury Pocket Guide \(CONUS\)](#)
- [Traumatic Brain Injury Care in the Department of Defense](#)

DCoE TBI Clinical Practice Guidelines and Clinical Guidance Documents

- [Case Management of Concussion/Mild TBI](#)
- [Co-occurring Conditions Toolkit: Mild Traumatic Brain Injury and Psychological Health](#)
- [DCoE's Military TBI Case Management Quarterly Newsletter](#)
- [DoD Coding Guidance for Case Management \(CM\) Services](#)
- [Indications and Conditions for In-Theater Post-Injury Neurocognitive Assessment Tool \(NCAT\) Testing](#)
- [Military TBI Case Management National Resource Fact Sheet](#)

DCoE: Additional Resources

- [Brain Injury Professional: Caring for Service Members, Veterans and Military Families Coping with Brain Injury](#)
- [Training and Education Products](#)
- [Mild Traumatic Brain Injury Web-based Case Studies](#)
- [Portable, Field-Based Devices for the Early Diagnosis of Mild Traumatic Brain Injury](#)
- [Traumatic Brain Injury: A Guide for Caregivers of Service Members and Veterans and Concurrent Modules](#)

DCoE Information Sheets

- [About CSTS](#)
- [About DCoE](#)

Trauma Spectrum Conference CD Toolkit List

- [About TBI](#)
- [Afterdeployment.org](#)
- [Automated Neuropsychological Assessment Metrics](#)
- [Common Data Elements for Research in Psychological Health and Traumatic Brain Injury](#)
- [DCoE/DoD Suicide Prevention Efforts](#)
- [Defense and Veterans Brain Injury Center \(DVBIC\)](#)
- [inTransition](#)
- [RESPECT-Mil](#)
- [T2 Virtual PTSD Experience](#)

Deployment Health Clinical Center (DHCC)

- [RESPECT-MIL Behavioral Health Specialist Manual](#)
- [RESPECT-MIL Care Facilitator Reference Manual](#)
- [RESPECT-MIL Primary Care Clinician's Manual](#)

Defense and Veterans Brain Injury Center (DVBIC)

- [3 Questions - DVBIC TBI Screening Tool](#)
- [DCoE & DVBIC Cognitive Rehabilitation for Mild Traumatic Brain Injury Report](#)
- [mTBI: Signs and Symptoms Fact Sheet](#)

The National Center for Telehealth and Technology (T2)

- [Information Paper on the National Center for Telehealth and Technology](#)
- [Information Paper on Mobile Applications](#)
- [Information Paper on PTSD Coach Mobile Application](#)
- [Information Paper on T2 Mood Tracker Mobile Application](#)
- [Information Paper on Breathe2Relax Mobile Application](#)
- [Information Paper on afterdeployment.org](#)
- [Information Paper on MilitaryKidsConnect.org](#)
- [Information Paper on Virtual Reality \(VR\) Exposure Therapy for Posttraumatic Stress Disorders \(PTSD\)](#)
- [T2 Workshop on Integration of Technology into Psychological Health and Traumatic Brain Injury](#)

Department of Veterans Affairs

- [Evidence Synthesis Report: Efficacy of Complementary and Alternative Medicine Therapies for Posttraumatic Stress Disorder](#)
- [Evidence Synthesis Report: Health Effects of Military Service on Women Veterans](#)

Trauma Spectrum Conference CD Toolkit List

- [Evidence Synthesis Report: Instruments for Diagnosing Generalized Anxiety and Panic Disorders in Primary Care](#)
- [HSR&D Cyber Seminars with links to Audio, Video, and Slides](#)
- [HSR&D FORUM: Post-Deployment Injuries: A Core Responsibility and Challenge](#)
- [Research Currents: May-June 2011](#)
- [Publication Brief: Growing VA Research Agenda for Women Veterans](#)
- [Publication Brief: Rates of PTSD and Depression Highly Prevalent among OEF/OIF Veterans with Alcohol and/or Drug Use Disorders](#)
- [Publication Brief: Veterans Reporting a History of Military Sexual Trauma are Treated in a Variety of VA Outpatient Mental Health Settings](#)
- [VA/DoD Collaboration Guidebook for Healthcare Research](#)

National Center for PTSD:

- [Course: PTSD 101](#)
- [Clinician's Trauma Update \(CTU\) Online: August 2011](#)
- [PTSD Research Quarterly: Health Services Use in the Department of Veterans Affairs among Returning Iraq War and Afghan War Veterans with PTSD](#)
- [Manual: Psychological First Aid: Field Operations Guide](#)
- [Manual: The Iraq War Clinician Guide](#)
- [Report of \(VA\) Consensus Conference: Practice Recommendations for Treatment of Veterans with Comorbid TBI, Pain, and PTSD](#)
- [Report of \(VA\) Consensus Conference: Practice Recommendations for Treatment of Veterans with Comorbid Substance Abuse and PTSD](#)

VA/DoD Clinical Practice Guidelines

- [Management of Concussion - mTBI](#)
- [Management of Major Depressive Disorder \(MDD\)](#)
- [Management of Medically Unexplained Symptoms: Chronic Pain and Fatigue](#)
- [Management of Opioid Therapy for Chronic Pain](#)
- [Management of Post-Operative Pain](#)
- [Management of Post-traumatic Stress](#)
- [Management of Substance Use Disorders \(SUD\)](#)

National Institutes of Health

- [Army Study to Assess Risk and Resilience in Service Members \(ARMY STARRS\)](#)

Trauma Spectrum Conference CD Toolkit List

- [Alcohol Use and Alcohol-Related Problems Before and After Military Combat Deployment](#)
- [Common Data Elements Catalog](#)
- [Library of Case Report Form \(CRF\) Modules and Guidelines](#)
- [National Library of Medicine - Office of Research on Women's Health Web Portal](#)
- [National Institute of Mental Health - Depression](#)
- [National Institute of Mental Health - Post-Traumatic Stress Disorder Booklet](#)
- [National Institute of Health - Post-Traumatic Stress Disorder Fact Sheet](#)
- [National Institute of Mental Health - Post-Traumatic Stress Disorder](#)
- [National Institute of Mental Health – Coping with Traumatic Events](#)
- [National Institute of Neurological Disorders and Stroke - TBI Common Data Elements Website](#)
- [National Institute of Neurological Disorders and Stroke - TBI Research](#)
- NIH has a public access data base for all of the funded grants. Detailed information, including project abstract, funding amount, lead investigators, and publications can be searched and reviewed through RePORTER, at <http://projectreporter.nih.gov/reporter.cfm>
- [Substance Abuse among the Military, Veterans, and their Families - April 2011](#)

The Substance Abuse and Mental Health Services Administration (SAMHSA)

- [Families Fact Sheet](#)
- [Strengthening Our Military Families](#)
- [Strengthening Initiative #3: Military Families](#)

Agency for Healthcare Research and Quality (AHRQ)

- [AHRQ's Effectiveness Health Care Program](#)
- [Depression After Traumatic Brain Injury](#)
- [Comparative Effectiveness of Multidisciplinary Postacute Rehabilitation for Moderate to Severe Traumatic Brain Injury in Adults](#)
- [Evidence-based Practice](#)
- [Traumatic Brain Injury and Depression Research Protocol](#)
- [TBI and Depression Report, April 2011](#)

Afterdeployment.org

- [Alcohol and Drugs](#)
- [Anger](#)
- [Anxiety](#)
- [Concerned Significant Others](#)
- [Depression](#)
- [Families & Friendships](#)

Trauma Spectrum Conference CD Toolkit List

- [Families with Kids](#)
- [Health and Wellness](#)
- [Life Stress](#)
- [Mild Traumatic Brain Injury](#)
- [Military Sexual Trauma](#)
- [Physical Injury](#)
- [Post-traumatic Stress](#)
- [Resilience](#)
- [Sleep](#)
- [Stigma](#)
- [Tobacco](#)
- [Spirituality](#)
- [Suicide](#)
- [Work Adjustment](#)
- [Afterdeployment.org Group Waiver](#)
- [Afterdeployment.org Trauma Spectrum Conference Presentation](#)
- [Group Recruitment Tips](#)

Army Office of the Surgeon General

- [Pain Management Task Force: Final Report, May 2010](#)

Substance Use Disorders Resources

- [Alcohol Screening and Brief Intervention \(SBI\) for Trauma Patients](#)
- [Brief Intervention: For Hazardous and Harmful Drinking](#)
- [Screening and Brief Intervention for Substance Misuse Among Patients with Traumatic Brain Injury](#)

Additional Resources

- [After Deployment](#)
- [Air Force Crossroads](#)
- [Air Force Wounded Warrior](#)
- [American Veterans with Brain Injuries](#)
- [Army Behavioral Health](#)
- [Army Resilience Training](#)
- [Brainline.org](#)

Trauma Spectrum Conference CD Toolkit List

- [Army Warfighter Brain Health Portal - Providers](#)
- [Army Warfighter Brain Health Portal - Soldiers](#)
- [Center for the Study of Traumatic Stress](#)
- [Citizen Soldier Support Program](#)
- [Combat and Operational Stress Control](#)
- [Comprehensive Soldier Fitness](#)
- [Defense and Veterans Brain Injury Center](#)
- [Deployment Health Clinical Center](#)
- [Hooah 4 Health's Deployment Information](#)
- [Institute of Medicine](#)
- [inTransition](#)
- [Leaders Guide for Managing Marines in Distress](#)
- [Marine Corps Community Services Deployment Support](#)
- [Marines Suicide Prevention](#)
- [Military OneSource](#)
- [National Center for PTSD](#)
- [National Resource Directory](#)
- [Naval Center Combat & Operational Stress Control \(NCCOSC\)](#)
- [Navy and Marine Corps Public Health Center's Minding Your Mental Health](#)
- [NCIRE-The Veterans Health Research Institute](#)
- [OASD Reserve Affairs](#)
- [Ourmilitary.mil](#)
- [Rand Corporation](#)
- [Real Warriors Campaign](#)
- [TRICARE](#)
- [U.S. Department of Veterans Affairs](#)
- [USMC Wounded Warrior Regiment](#)
- [Veterans Affairs' Mental Health Home](#)
- [National Suicide Prevention Hotline](#)

Trauma Spectrum Conference CD Toolkit List

"The appearance of hyperlinks does not constitute endorsement by the Department of Defense of this Web site or the information, products or services contained therein. For other than authorized activities such as military exchanges and Morale, Welfare and Recreation sites, the (Department of Defense/the U.S. Army/the U.S. Navy/the U.S. Air Force/the U.S. Marine Corps, etc.) does not exercise any editorial control over the information you may find at these locations. Such links are provided consistent with the stated purpose of this DoD Web site."

Conference Schedule and List of Presentations

The Fourth Annual Trauma Spectrum Conference Bridging the Gap between Research and Clinical Practice of Psychological Health and Traumatic Brain Injury: Prevention, Diagnosis, Treatment and Recovery for the Iraq and Afghanistan Cohort			
Time	Location	Agenda Item	Speaker
7:30 a.m. – 5:00 p.m.	Registration		
8:30 a.m. – 8:40 a.m.	Auditorium	Administrative Announcements	
8:40 a.m. – 8:50 a.m.	Auditorium	Welcome and Opening Remarks	Capt. Paul Hammer, M.D., DCoE
8:50 a.m. – 9:00 a.m.	Auditorium	Welcome and Opening Remarks	Janine Austin Clayton, M.D., NIH
8:50 a.m. – 9:00 a.m.	Auditorium	Welcome and Opening Remarks	Linda Lipson, M.A., VA
9:00 a.m. – 9:10 a.m.	Auditorium	Keynote Address	Ramon Diaz Arrastia, M.D., Ph.D.
10:00 a.m. – 10:30 a.m.	Break		
10:30 a.m. – 11:15 a.m.	Auditorium	Integrative Telehealth/Mobile Technologies	Greg Gahm, Ph.D.
11:15 a.m. – noon	Auditorium	Evidence-based Practice and Comparative Effectiveness	Elise Berliner, Ph.D.
Noon – 12:30 p.m.	Break		
12:30 p.m. – 1:30 p.m.	Auditorium	Sleep Disorders	Anthony Panettiere, M.D.
1:30 p.m. – 1:45 p.m.	Break		
1:45 p.m. – 3:15 p.m.	Balcony A	Substance Use Disorders	John Corrigan, Ph.D.
	Auditorium	Cognitive Rehabilitation	Heather Belanger, Ph.D.
	Room D	Implementation Science	David Atkins, M.D., M.P.H. Amy M. Kilbourne, Ph.D., MPH Mona Ritchie, M.S.W.
	Balcony B	Diagnostic Assessment: Trauma/Battlefield/Cognitive Markers	Katherine Helmick, M.S., RN, CNRN, CRNP
	Room F1/F2	Women's Health Research	Kristin Mattocks, Ph.D., M.P.H. Anne Sadler, R.N., Ph.D.
	Balcony C	Co-occurring Disorders	Miguel Roberts, Ph.D. Jay Uomoto, Ph.D.
3:15 p.m. – 3:30 p.m.	Break		
3:30 p.m. – 4:15 p.m.	Auditorium	ARMY STARRS	Michael Schoenbaum, Ph.D.
4:15 p.m. – 4:30 p.m.	Auditorium	Wrap Up	Alison Cernich, Ph.D.
4:30 p.m. – 6:30 p.m.	Poster Session in Room E1/E2		

Conference Schedule and List of Presentations

The Fourth Annual Trauma Spectrum Conference Bridging the Gap between Research and Clinical Practice of Psychological Health and Traumatic Brain Injury: Prevention, Diagnosis, Treatment and Recovery for the Iraq and Afghanistan Cohort			
Time	Location	Agenda Item	Speaker
7:30 a.m. – 2:00 p.m.	Registration		
8:30 a.m. – 8:40 a.m.	Auditorium	Welcome and Opening Remarks	Lisa Begg, Dr., P.H., R.N.
8:40 a.m. – 9:30 a.m.	Auditorium	Keynote Address	Terry Keane, Ph.D.
9:30 a.m. – 10:00 a.m.	Auditorium	Major Depressive Disorders	COL. (ret.) Elspeth Cameron Ritchie, M.D., Ph.D.
10:00 a.m. – 10:30 a.m. Break			
10:30 a.m. – noon	Room A	Implementation Science	Miles McFall, Ph.D. Andrew Saxon, M.D.
	Balcony A	Cognitive Rehabilitation	Therese O’Neil-Pirozzi, Sc.D. Elizabeth Twamley, Ph.D.
	Room F1/F2	Substance Use Disorders	Lisa Najavits, Ph.D. James M. Bjork, Ph.D.
	Balcony B	Integration of Technology into Psychological Health and Traumatic Brain Injury Care	Karl Moe, Ph.D. Elspeth Fast. M.S.W., L.I.C.S.W. Leslie Morland, Psy.D. Bridget Ruiz, M.Ed.
	Room E1/E2	Implementation of Wellness Strategies	Mark Bates, Ph.D. Colanda Cato, Ph.D.
	Auditorium	PTSD Therapies with Ongoing Research Updates	Ronald Hoover, Ph.D.
	Room D	Decision Sciences	Nananda Col, M.D., M.P.P., Ph.D.
	Balcony C	Pain Panel	Col. Chester Buckenmaier, USA, M.D. Rollin “Mac”Gallagher, M.D., M.P.H. Col. Kevin Galloway, USA, B.S.N., M.H.A.
3:15 p.m. – 3:30 p.m. Break			
12:15 p.m. – 1:15 p.m.	Auditorium	Real World Implementation and Training for Evidence Based Psychotherapies	Brad Karlin, Ph.D. David Riggs, Ph.D.
1:15 p.m. – 1:45 p.m. Break			
1:45 p.m. – 4:15 p.m.	Room F1/F2	Implementation Science	Kate Chard, M.D. Joe Ruzek, Ph.D. Brad Felker, M.D.
	Room D	SLP Guidance	Carole Roth, Ph.D. Micaela Cornis-Pop, Ph.D., CCC

Conference Schedule and List of Presentations

The Fourth Annual Trauma Spectrum Conference Bridging the Gap between Research and Clinical Practice of Psychological Health and Traumatic Brain Injury: Prevention, Diagnosis, Treatment and Recovery for the Iraq and Afghanistan Cohort			
Time	Location	Agenda Item	Speaker
145 p.m. – 415 p.m.	Balcony A	1. AHRQ Effective Healthcare Program 2. Trauma Center Interventions 3. Access to Recovery (ATR): Meeting the Behavioral Health Needs of Veterans and Military Service Members	Stephanie Chang, M.D., M.P.H. Oscar Guillamondegui, M.D. Linda Fulton, Ph.D.
	Balcony B	Integration of Technology into Psychological Health and Traumatic Brain Injury Care	Karl Moe, Ph.D. Elspeth Fast, M.S.W, L.I.C.S.W. Leslie Morland, Psy.D. Bridget Ruiz, M.Ed.
	Room A	Decision Sciences	Nananda Col, M.D., Ph.D.
	Room E1/E2	Getting Further Faster by Sharing TBI Research Data	David Okonkwo, M.D., Ph.D. Mona Hicks, Ph.D. David Tulsy, Ph.D.
	Balcony C	Implementation of Neuroimaging	Gerard Riedy, Ph.D., M.D. Larry Latour, Ph.D. Mingxiong Huang, Ph.D.
	Auditorium	Psychological Health Session	Miguel Roberts, Ph.D. Col. Christopher Robinson, USAF, Ph.D., M.P.H., M.A. Cmdr. Meena Vythilingam, USPHS, M.D.

Sponsoring Organizations

Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE)



DEFENSE CENTERS OF EXCELLENCE For Psychological Health & Traumatic Brain Injury

The Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) was established in November 2007 to integrate knowledge and identify, evaluate and disseminate evidence-based practices and standards for the treatment of psychological health and traumatic brain injury within the Defense Department. It is committed to ensuring those service members, veterans and families who are dealing with psychological health issues or traumatic brain injury have easy access to high quality treatment, rehabilitation and reintegration programs.

As an organization of the Defense Department, DCoE partners with the Department of Veterans Affairs and a national network of military and civilian agencies, community leaders, advocacy groups, clinical experts and academic institutions to establish best practices and quality standards for the treatment of traumatic brain injury and psychological health.

National Institutes of Health (NIH)



The National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services, is the primary federal agency for conducting and supporting medical research. Helping to lead the way toward important medical discoveries that improve people's health and save lives, NIH scientists investigate ways to prevent disease as well as the causes, treatments and even cures for common and rare diseases. Composed of 27 Institutes and Centers, the NIH provides leadership and financial support to researchers in every state and throughout the world. For over a century, the NIH has played an important role in improving the health of the nation.

NIH is the steward of medical and behavioral research for the Nation. Its mission is science in pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to extend healthy life and reduce the burdens of illness and disability.

For more information, please visit our website at nih.gov.

Sponsoring Organizations

Department of Veterans Affairs (VA)



The Department of Veterans Affairs (VA) was established on March 15, 1989, succeeding the Veterans Administration. It is responsible for providing federal benefits to veterans and their families. VA is the second largest of the 15 Cabinet departments and operates nationwide programs for health care, financial assistance, and burial benefits. There are nearly 23 million U.S. veterans alive today, and in fact a quarter of Americans are potentially eligible for VA benefits and services because they are veterans, family members, or survivors of veterans.

Perhaps the most visible of all VA benefits and services is health care. From 54 hospitals in 1930, VA's health care system now includes 152 hospitals, with at least one in each state, Puerto Rico, and the District of Columbia. VA operates more than 1,400 sites of care, including 974 outpatient clinics, 133 Community Living Centers, 98 residential rehabilitation treatment programs, 300 veterans Centers, and more than 100 comprehensive home-care programs. Providing a broad spectrum of medical, surgical, and rehabilitative care, VA has experienced unprecedented growth in the medical system workload, providing care to more than six million veterans annually.

VA also manages the largest medical education and health professions training program in the United States. In 2010, 36,747 medical residents, 20,516 medical students, 239 advanced fellows, and 1,267 dental residents and dental students received some or all of their clinical training in VA. Of VA's 152 medical centers, 124 have affiliation agreements with 112 of the 134 Liaison Committee on Medical Education-accredited medical schools in the U.S., and with 15 of the nation's 26 accredited osteopathic medical schools.

The VA Research and Development program—an intramural program located within the VA health care system—has served as the foundation for advancements in veterans' health care for more than 85 years. VA Research currently supports more than 3,000 active investigators and support staff at more than 100 sites across the nation, and its career development program is helping to train America's next generation of health researchers.

The VA Research program, unique in that it is the only research program focused wholly on conducting groundbreaking research to meet the full spectrum of veterans' health care needs, has earned an international reputation for excellence in areas such as aging, chronic disease, prosthetics, polytrauma, mental health, and health services research. Because seven in 10 VA researchers are also clinicians, VA is uniquely positioned to translate research results into improved patient care. The VA Research program embraces its close affiliations with academic institutions and fosters strong collaborations with federal agencies and others to accelerate the translation of research to application and strengthen the programs' national health impact.

Conference Audio and Video Content

Listing of Links and Resources for the 4th Annual Trauma Spectrum Conference

Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury:
dcoe.health.mil/Default.aspx

Conference Website:
dcoe.health.mil/Training/TraumaSpectrumConference.aspx

Video content for Day 1 Presentations given in the Main Auditorium:
videocast.nih.gov/Summary.asp?File=17025

Video content for Day 2 Presentations given in the Main Auditorium:
videocast.nih.gov/Summary.asp?File=17029

DISCLAIMER

The views contained in the conference proceedings are those of the respective speaker and are not to be construed as the views of the Defense Department, the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury, the National Institutes of Health or the Department of Veterans Affairs.

PHOTO DISCLAIMER

The photos used within this document are the property of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury, the National Institutes of Health, and the Department of Veterans Affairs and have been provided by the National Institutes of Health.

Acknowledgements

The Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury, the National Institutes of Health and the Department of Veterans Affairs would like to thank the following people for their dedication and hard work. It is their contributions that made this conference a success:

Jennifer Barrera
Lisa Begg, Dr. P.H., R.N.
Alison Buck
Christopher Burke, Ph.D.
Frank Carter
Alison Cernich, Ph.D.
Jennifer Chang
Lt. Cmdr. Clifford Coleman, USPHS, M.A.
Emily Deck
Aly Glick
Gregory Gerard Greer, M.A.
Lynn Blakely Hallard, M.S.L.S.
Ramona Hicks, Ph.D.
Linda Lipson, M.A.
Robert Mays, Ph.D., M.S.W.
Rachel Morrison
Lolita O'Donnell, Ph.D., R.N.
Kathy O'Leary, M.S.W.
Rachel L. Palmieri, M.S., R.N., A.N.P.-B.C.
Kelly Thibideau
Sean Tolliver
Susan Tripp
Jay Uomoto, Ph.D.

