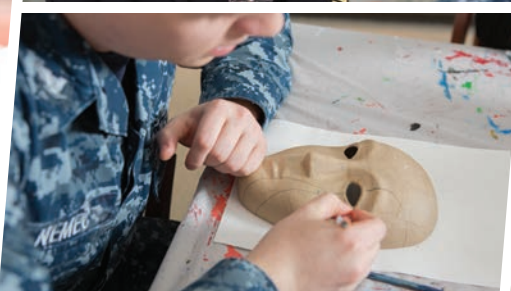
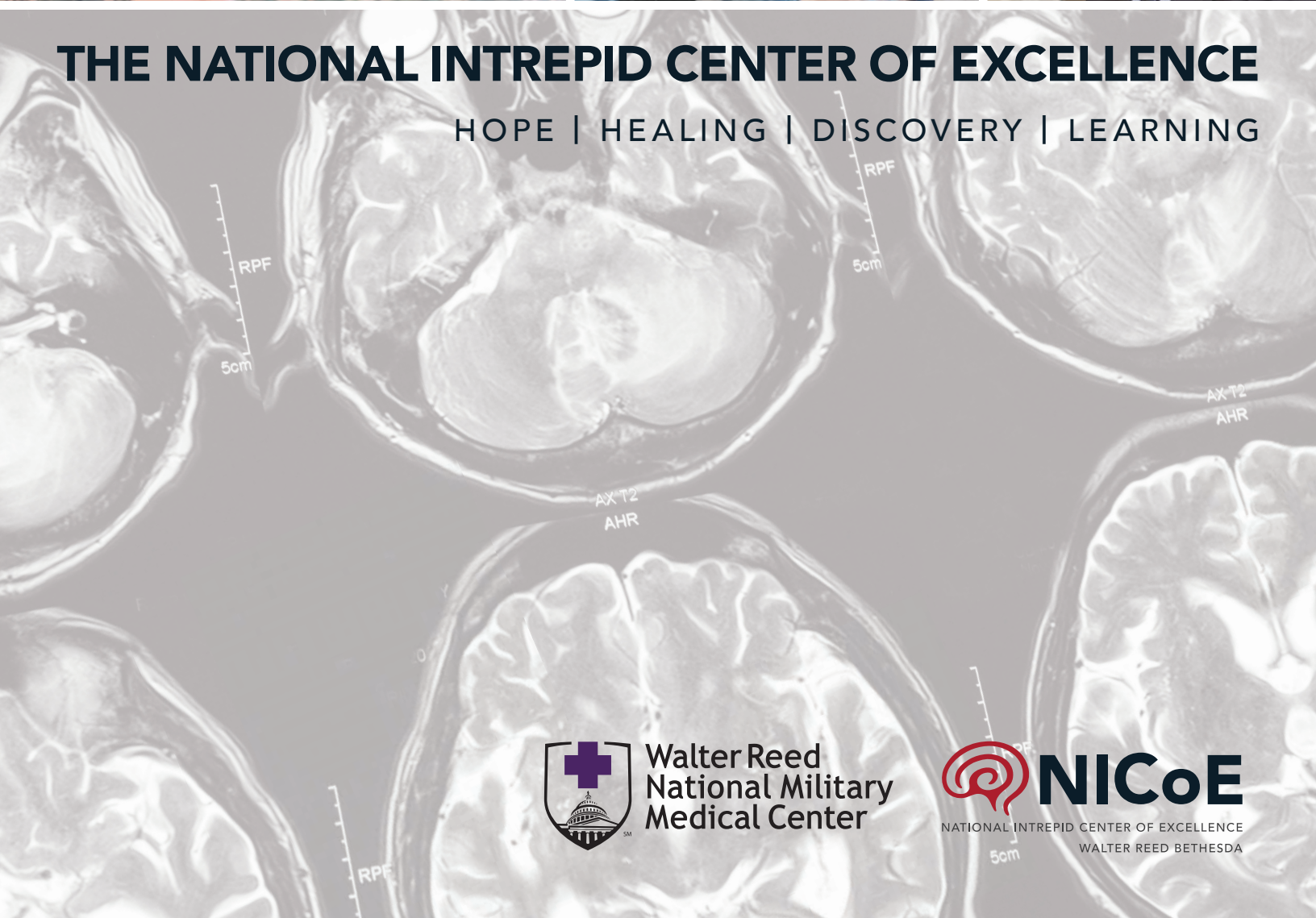


ANNUAL REPORT
2015



THE NATIONAL INTREPID CENTER OF EXCELLENCE

HOPE | HEALING | DISCOVERY | LEARNING



Walter Reed
National Military
Medical Center



NICoE

NATIONAL INTREPID CENTER OF EXCELLENCE
WALTER REED BETHESDA

Letter to Stakeholders



Colleagues:

Five years ago the National Intrepid Center of Excellence (NICoE) opened its doors, and from day one we have lived by the mantra: "the patient and family are at the center of everything we do." We continue to make a difference with every patient, every day, through cutting-edge diagnostic evaluations, comprehensive treatment planning, outpatient and inpatient clinical care, research, and education. This full spectrum of traumatic brain injury (TBI) care is experienced in a supportive environment that promotes physical, psychological, and spiritual healing.

Our outstanding, interdisciplinary team bridges clinical care with innovative research to build greater understanding of the complex nature of TBI and psychological health (PH) conditions to lead improved treatment across the Military Health System (MHS) and beyond. The unmatched care provided to patients and the resulting impact of the center and our staff's work have continued to receive national attention, putting important messages about the invisible wounds of war in the national dialogue.

We are proud of the NICoE's many accomplishments achieved in fiscal year (FY) 2015 and the organization's ever-increasing ability to serve its complex patient population. This third annual report encapsulates these key successes and recognizes progress made by the NICoE's dedicated staff.

FY 2015 proved to be a very important and exciting year for the NICoE. In July, the Walter Reed National Military Medical Center's (WRNMMC) TBI Service, supported by the Defense and Veterans Brain Injury Center (DVBIC), and the NICoE formally joined to establish a new directorate. The NICoE Directorate, now aligned under the WRNMMC, will continue to deliver patient-focused care while providing opportunities for expanded treatment options and advancements in research. Cross-collaboration among the NICoE, WRNMMC, and the Uniformed Services University of the Health Sciences (USU) is also a result of the integration, ensuring an effective and synergistic TBI research mission and experiential learning opportunities for America's next generation of military clinicians and medical leaders. Most importantly, integration has allowed for a more efficient and seamless continuum of care for our patients at WRNMMC. It is no coincidence that WRNMMC's driving principle is also "the patient and family are at the center of everything we do." It is indeed a shared ideal.

The NICoE Directorate's ongoing collaboration with partners — including the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE), DVBIC, the U.S. Department of Veterans Affairs (VA), USU, the National Institutes of Health (NIH), as well as other federal, academic, and private institutions — will continue to push the bounds of innovation and provide even greater opportunities to advance medical research, share best practices, and ultimately improve care for patients and families within the MHS, the VA, and in civilian practice.

With unwavering support from the MHS and its leadership, the momentum that drives us into FY 2016 is immense and will enable us to expand the opportunities that make a difference in the lives of those affected by TBI.

Sincerely,

A handwritten signature in black ink that reads "Walter M. Greenhalgh".

Captain Walter M. Greenhalgh
Medical Corps, United States Navy
Director for the National Intrepid Center of Excellence
Walter Reed National Military Medical Center



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CELEBRATING **5 YEARS** OF EXCELLENCE

In 2015, the NICoE marked the five-year anniversary of opening its doors to patients and their families. This milestone celebrated the growing success of the NICoE's innovative model, the commitment of pioneers in TBI and PH condition treatment and research, and the dedicated support of the MHS and Intrepid Fallen Heroes Fund to improving the lives of those impacted by TBI.



Introduction

Dedicated to improving the lives of service members and families affected by traumatic brain injury (TBI), the National Intrepid Center of Excellence (NICoE) Directorate employs a unique, holistic approach to clinical treatment by using interdisciplinary teams and integrative medicine in a collaborative effort with patients, families, referring providers, and researchers.

Since its establishment in 2010, the NICoE has played a leading role in advancing the understanding of complex and comorbid TBI and PH conditions in order to maximize wellness and relieve suffering for its patient population. Over the past five years, the NICoE has continued to make advancements in cutting-edge diagnostic evaluations, comprehensive treatment planning, outpatient clinical care, research, and education, providing patients and families the full spectrum of TBI care in a supportive environment that promotes physical, psychological, and spiritual healing.



Mission, Vision, and Guiding Principles

The NICoE's Mission is to ...

Improve the lives of patients and families impacted by TBI through excellence and innovation

The NICoE's Vision is to ...

Be a global leader in TBI care, research, and education

The NICoE's Guiding Principles are ...

Excellence, Innovation, Compassion, Honor, and Collaboration

To America's Military Heroes
In Recognition of your Patriotism, Courage and Sacrifice
A PLACE TO HEAL THE INVISIBLE WOUNDS OF WAR

From the American People
and
The Intrepid Fallen Heroes Fund

The NICoE Directorate

ESTABLISHING A WORLD-CLASS, PATIENT- AND FAMILY-CENTERED TBI CARE AND RESEARCH CENTER

In 2007, Congress mandated that the Department of Defense (DoD) create a center of excellence to advance our nation's understanding of the visible and invisible wounds of TBI and associated conditions caused by the wars in Iraq and Afghanistan. The vision for this center was a state-of-the-art facility that would respond to the growing needs of those with TBI and PH conditions and serve as a leader in TBI care and research throughout the MHS. The Intrepid Fallen Heroes Fund, founded and led by the Fisher family, raised \$65 million in donations from the American public for the creation of the NICoE.

The NICoE opened its doors to patients in October 2010 and has been dedicated to providing excellent TBI and PH care, research, and education ever since.

INTEGRATING THE NICOE UNDER THE WALTER REED NATIONAL MILITARY MEDICAL CENTER

On the national level, the MHS TBI Pathway of Care, as managed by the Defense and Veterans Brain Injury Center (DVBIC), unites DoD TBI organizations and assets to create a comprehensive and integrated continuum of care from prevention to reintegration. To strengthen MHS TBI care and research in the National Capital Region (NCR), the NICoE and the TBI Service at WRNMMC integrated their capabilities in February 2015, establishing the NICoE Directorate. As a key partner in the Pathway, the NICoE Directorate is charged with:

- Addressing the most complex diagnostic and treatment challenges for patients with TBI and complex psychological and social challenges who have persistent impairment of function despite intensive treatment
- Conducting complex diagnostic evaluations and holistic intensive day treatment to clarify diagnoses, begin long-term recovery and instill hope for both patients and families
- Acting as the primary site for conducting translational research to foster improved outcomes across the enterprise and beyond

The NICoE Directorate provides a single point of entry for patients referred to the care system at WRNMMC and expands the capacity to help service members and their families manage their TBI conditions. It has combined and coordinated TBI services to create a seamless system of care, joining its intensive outpatient program for those beneficiaries with persistent symptoms after injury, with the inpatient TBI consultation service and long-term outpatient program.

Through the efforts of countless working group meetings and dedicated staff and leaders, the new organizational structure preserved the best of the legacy organizations, while enhancing NICoE capacity and capabilities, and giving patients and families access to more comprehensive resources at WRNMMC.

The integration also served as a launching pad for strengthening research collaborations. Researchers from the NICoE, Uniformed Services University of Health Sciences (USU), and the National Institutes of Health (NIH) joined efforts and established the TBI Research Synergy Board (RSB). The TBI RSB facilitates collaboration, maximizes assets, and improves efficiencies of TBI care and research efforts across the NCR.

The integration of the NICoE with WRNMMC's TBI resources was pivotal to supporting the evolution of TBI care and research in the NCR and will continue to promote its goal of becoming a premier authority on complex TBI and comorbid PH conditions.

“The NICoE shall provide a national level capability to address the most complex diagnostic and treatment challenges for patients with TBI and complex psychological and social challenges who have persistent impairment of function despite intensive treatment. The NICoE will conduct complex diagnostic evaluations and holistic intensive day treatment to clarify diagnoses, begin long-term recovery, and instill hope for both patients and their families. The NICoE will also conduct translational research to foster improved outcomes across the enterprise and beyond.”

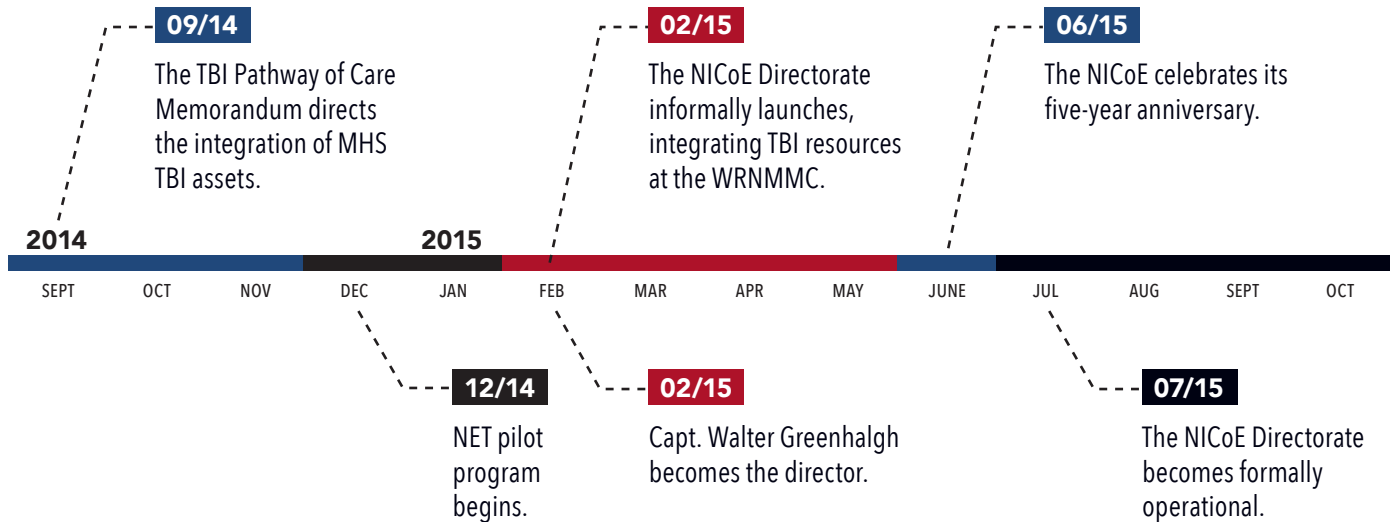
— DR. JONATHAN WOODSON,
ASSISTANT SECRETARY OF
DEFENSE FOR HEALTH AFFAIRS
(ASD/HA)

ASD/HA Memorandum “The Military Health System Traumatic Brain Injury Pathway of Care and Alignment of the National Intrepid Center of Excellence within That Pathway, September 2014”



**Walter Reed
National Military
Medical Center**

FY 2015 Integration Milestones



“What is truly extraordinary is that we are taking two systems that each have a venerable history on both sides of the street, and we’re combining them into one to meet the unique demands of our patient population.”

— DR. LOUIS FRENCH, DEPUTY DIRECTOR FOR OPERATIONS

NICOE CHANGE OF CHARGE

Navy Capt. Walter Greenhalgh was selected to serve as the new NICoE director, following the announcement of Navy Capt. Sara Kass’ retirement in late 2014. In February 2015, the NICoE hosted a Change of Charge ceremony during which the “torch of authority” was passed from Kass to Greenhalgh.


“This is an exciting evolution in the TBI Pathway of Care,” said Greenhalgh as he assumed command. “Capt. Kass’s vision and competence set the stage for the way forward. Success is inevitable as she passes the torch.”

FAREWELL TO DR. JAMES P. KELLY



FY 2015 saw the departure of one of the founding visionaries of the NICoE, Dr. James Kelly. A neurologist by training, Kelly was a vital champion of the NICoE’s development, contributing to its organizational structure, the execution of its vision, and the establishment of partnerships and relationships with other organizations. As NICoE’s first director, he saw this organization through its initial growth in importance as a critical MHS asset for the treatment of TBI.

After playing a significant role in supporting the NICoE through integration with WRNMMC, Kelly returned to his family and his Colorado roots this past summer. We recognize his dedicated service to the NICoE and his commitment to those affected by the invisible wounds of war. Fair winds and following seas, Dr. Kelly.



"This program changed our lives and saved our marriage. We saw what each other have been going through from a completely different perspective. I understood what my husband has been going through for the past few years quietly. I understood how deep his psychological scars are and how debilitating his physical pain actually is."

— NICOE PATIENT SPOUSE

High-Tech, High-Touch Patient Care: The NICoE Clinical Model

INTERDISCIPLINARY, INTEGRATIVE CARE

The NICoE's clinical offerings and capacities expanded in FY 2015 through its transition under WRNMMC and joining with the WRNMMC TBI Service. As a result, the NICoE now serves a broader range of patients — including active-duty, National Guard and Reserve service members; adult beneficiaries; and veterans — with all degrees of TBI severity.

The incorporation of WRNMMC's TBI Service, including its Brain Fitness Center (BFC) expanded the NICoE's ability to offer individual outpatient appointments and treatment of cognitive dysfunction. As a result, the NICoE delivers a more comprehensive array of services. The NICoE Evaluation Track (NET), a new program for FY 2016, is a one-week offering of TBI diagnostic and treatment planning services based on the NICoE's four-week Intensive Outpatient Program (IOP). These expanded offerings reinforce the NICoE's goal to provide excellent, holistic care and treatment solutions to patients and families affected by TBI.

“The NICoE is a great example of putting the patient at the center.”

— ARMY MAJ. GEN. JEFFREY CLARK, THEN DIRECTOR, WRNMMC



SHARING THE NICOE CARE MODEL ACROSS THE MHS

Intrepid Spirit Centers provide high-quality care to patients and families affected by TBI and PH conditions, and the NICoE care model serves as an example for their work. In FY 2015, clinicians and staff from several Intrepid Spirit Centers spent time at the NICoE to get hands-on experience with the NICoE care model and research program that they take with them back to their patients and families.

Each Intrepid Spirit Center is unique, as it reflects the demands of the local in-garrison population, while also serving the needs of the MHS TBI Pathway of Care. By using standardized data collection and research methods, the Intrepid Spirit Centers serve to build the national body of research and data that allows the NICoE to further advance understanding of TBI and PH conditions and improve treatment and care.

The NICoE care model is also serving as an archetype for other military treatment facilities. For example, in the last year, clinicians and staff from the Naval Special Warfare Command (NSW) spent time learning NICoE best-practices while sharing their own knowledge and experience.

As additional Intrepid Spirit Centers open to patient care and research, the NICoE will continue to lead efforts to advance treatment and care in TBI and PH conditions and to share their expertise across the MHS and beyond.

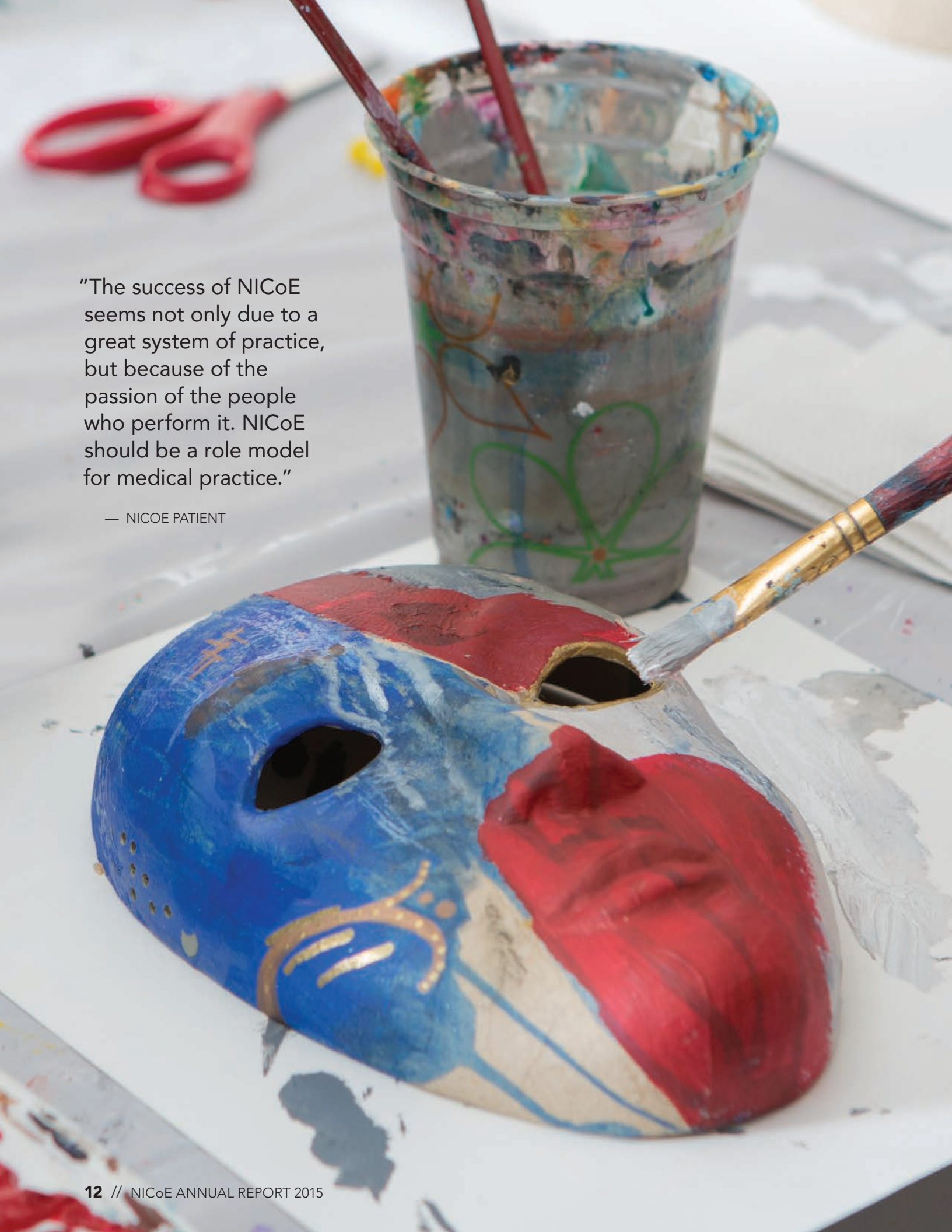
INTREPID SPIRIT CENTERS

Intrepid Spirit Centers are a growing part of the critical response to addressing the invisible wounds of war with an ever increasing patient population. Since the inception of the NICoE, plans for nine additional TBI and PH condition facilities have been planned at military treatment facilities nationwide. While the NICoE is a primary focal point for TBI and PH patient care and research, the need to expand services for patients, their family members, and referring providers through-out the MHS has always been a priority. In FY 2015, three Intrepid Spirit Centers provided TBI treatment and solutions to patients and families. Two additional Intrepid Spirit Centers were on schedule to open in FY 2016.

- Fort Belvoir, Virginia – Fort Belvoir Community Hospital (opened in 2013)
- Camp Lejeune, North Carolina – Camp Lejeune Naval Hospital (opened in 2013)
- Fort Campbell, Kentucky – Blanchfield Community Hospital (opened in 2014)
- Fort Bragg, North Carolina – Womack Army Medical Center (opening in FY 2016)
- Fort Hood, Texas – Carl R. Darnall Army Medical Center (opening in FY 2016)
- Joint Base Lewis-McChord, Washington (ground-breaking in FY 2016)
- Fort Carson, Colorado (TBD)
- Camp Pendleton, California (TBD)
- Fort Bliss, Texas (TBD)

"The success of NICoE seems not only due to a great system of practice, but because of the passion of the people who perform it. NICoE should be a role model for medical practice."

— NICoE PATIENT





Fostering Hope and Healing Through Clinical Services and Treatment Interventions

The NICoE delivers a broad range of patient- and family-centered assessment and treatment interventions, encompassing traditional medicine, advanced diagnostic techniques, and complementary and alternative medicine (CAM). The NICoE offered the following services in FY 2015:

- Acupuncture
- Animal-Assisted Therapy
- Art Therapy
- Assistive Technology
- Audiology
- Biofeedback
- Case Management
- Cognitive Rehabilitation
- Driving Assessment and Rehabilitation
- Patient and Family Education
- Family Counseling
- Music Therapy
- Neuroimaging
- Neuropsychology
- Nutrition
- Occupational Therapy
- Ophthalmology
- Optometry
- Physical Therapy
- Primary Care
- Psychiatry
- Psychotherapy
- Sleep Medicine
- Speech Language Pathology
- Spiritual Counseling
- Vestibular Assessment and Treatment

National Endowment for the Arts Partners with Military to Heal Invisible Wounds

Health.mil
March 27, 2015

The NEA and NICoE have partnered to use innovative art therapy to help heal service members suffering from the invisible wounds of war.

NICoE IN THE NEWS



THE FOUR-WEEK INTENSIVE OUTPATIENT PROGRAM

The four-week IOP operates with an innovative, interdisciplinary care model, to which service members or veterans suffering from complex, comorbid TBI and PH conditions may be referred. Co-located teams of specialized providers work closely with these patients and their families to develop a tailored, holistic patient treatment plan that focuses on diagnostic determination, treatment planning, symptom relief, and functional recovery.

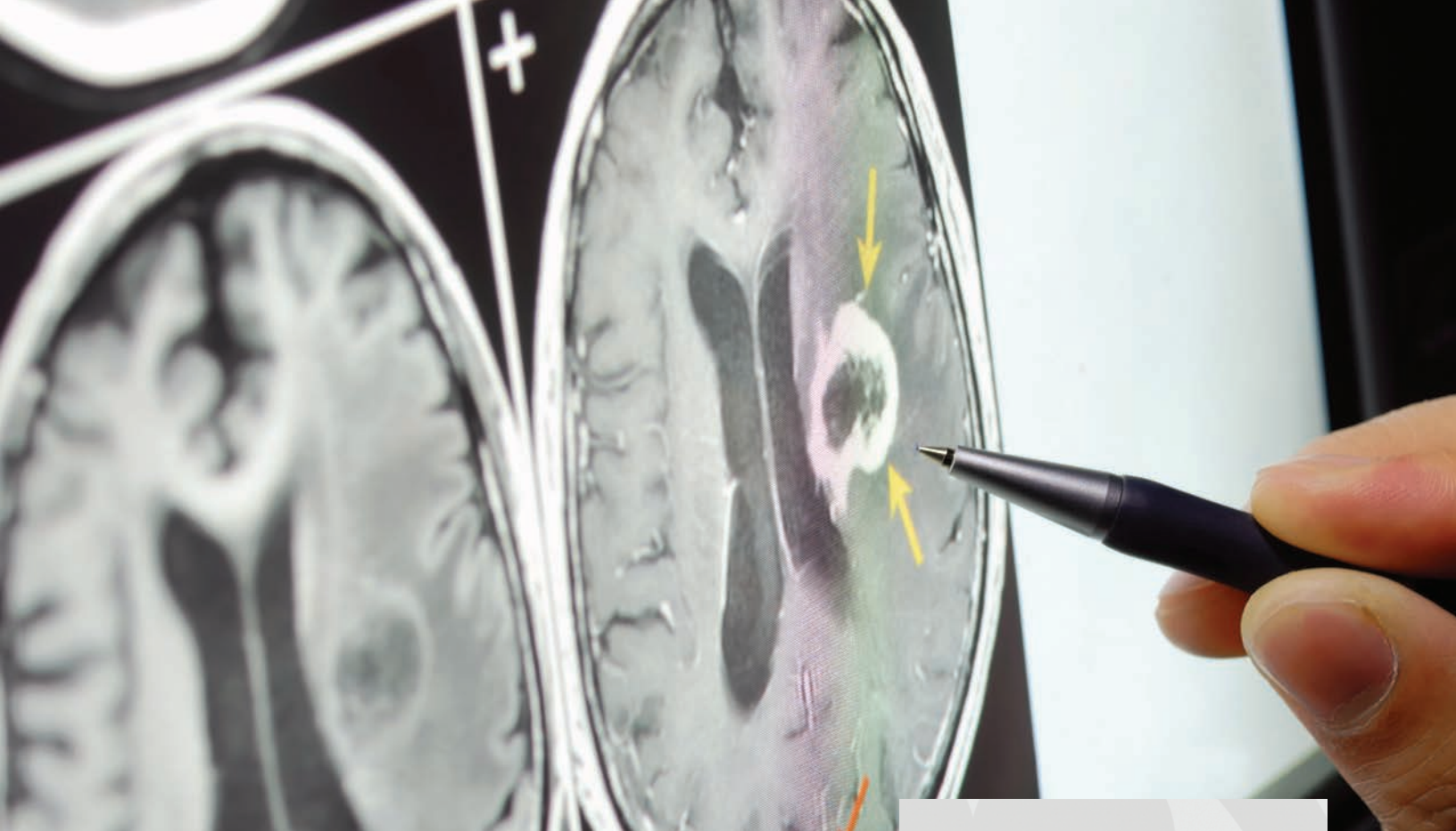
NICoE providers, as an interdisciplinary care team, collect a comprehensive patient history, perform clinical evaluations, reevaluate patients' prescription medications, help patients undergo diagnostic exams, and encourage them to participate in complementary and integrative care offerings such as yoga, acupuncture, and the healing arts.

Each week, the IOP admits a new cohort of five patients and their families to its programs, with 237 patients passing through this robust program in FY 2015. Since the inception of the IOP in 2010, more than 960 patients and families have benefitted from its services.

A variety of traditional medical techniques are used to diagnose and evaluate the symptoms and sources of patients' concerns, and provide a comprehensive assessment and inform treatment planning. Numerous complementary, alternative, and integrative treatments are part of the patient's IOP stay and offer a holistic approach to their recovery. The NICoE develops individualized patient- and family-centered discharge plans to help sustain patients on a trajectory of successful treatment with their home station provider.

“This program successfully discovered the root of every one of my complaints. The multi-faceted approach towards medical problem solving was mind blowing ... I did not know that this level of medical care could exist in the Military.”

— NICOE PATIENT



Weeks One and Two

- Patients are exposed to the full spectrum of TBI services and undergo a comprehensive evaluation providing maximal opportunity for patient-provider interaction.
- The clinical team and patients work together to identify the most effective treatment options, and then the clinicians educate patients on TBI management and rehabilitation tools.
- The clinical team develops a treatment program tailored to the needs of each patient, the extent of his/her injuries, and the circumstances of his/her home life. During this process, the clinicians support patients in setting short- and long-term health care goals.
- Patients attend courses focused on improving confidence; improving daily functioning; setting behavioral health, cognition, pain, sleep, and satisfaction goals; and staying focused and managing energy, which continue through weeks three and four.

Weeks Three and Four

- Based on evaluations and preferred treatment options, the clinical team establishes effective individualized treatment plans for the patient and his/her family for ongoing treatment.
- Families may be included in this time of exploration, strategizing, and problem solving.
- The clinical team provides findings and recommendations to the service member and his/her family upon discharge and also shares these recommendations directly with the home station medical team via telephone conference to ensure continuity of care.

Patient Satisfaction Results With the IOP

91.8%

Total Satisfaction

97.4%

Overall Category

89.2%

Self-Advocacy

84.6%

Admission and Discharge

90.3%

Wait Time and Appointment Time

92.3%

Education

97.1%

Environment

96.3%

Staff

Patient Profile

CREATING HEALING THROUGH EDUCATION, EMPOWERMENT, AND COMMUNITY

After three decades of service as a Marine and two combat deployments, Marine "C" was miserable and exhausted. While deployed, he sustained a blast injury, which literally knocked him off his feet and threw him into the air. As a result, he cracked his neck and had significant shrapnel wounds to his leg and torso. The next day he was medevacked out for treatment.

His recovery was difficult for him and his family. He had frequent headaches, blurred vision, and tinnitus, as well as significant memory problems. He went from physician to physician explaining his symptoms repeatedly, but he was frustrated, feeling that his recovery was stalled. He was tired, he felt overly medicated, and at the end of the day, he felt the physicians failed to understand what it was like to manage these symptoms on a daily basis. He was working hard to keep his head above water at work, but at home he was irritable, frustrated, and exhausted. He didn't feel that his recovery was progressing. Years went by, and he pushed everything down and put it aside. He had good days and bad, and the bad were winning. His family could not deal anymore with the frustration, the anger, and the emotionless person he had become. His marriage ended a few years after returning. One day he told his frustrations to a battle buddy. His friend shared his experience, but said that things really turned a corner for him after he went to the NICoE. His friend told him, "You need to go."

Marine "C" was apprehensive. He had lost faith in the system, and he didn't want to talk about what had happened on deployment — talking only brought up bad memories. Despite his concerns, he finally agreed to come to the NICoE in the spring of 2015. The results were remarkable.

When he arrived, Marine "C" met others from across different services who were dealing with similar experiences. For the first time, he didn't need to list his concerns or explain his symptoms. The NICoE took a holistic approach to his rehabilitation and reintegration. His team of providers understood how his different symptoms were connected. More importantly, they could explain how these symptoms were connected in a way that made sense to him.

The NICoE gave him the "breathing room to be able to deal with things." They conducted a full physical exam and lab tests, but they explained everything in a way that directly linked to his symptoms and his experience of recovery. They taught him skills and strategies to navigate daily living. After one week, he saw a significant improvement in his chronic pain, without the aid of medication. He especially benefitted from neurological treatments for his headaches, physical therapy, and assistive technology. By the third week, he was convinced that the NICoE model should be the standard of care. During his month at the NICoE, he learned to address or manage most of his TBI-related issues. He continues to use the skills he learned on a daily basis.

"NICoE gave me the breathing room to be able to deal with things...I know for a fact. NICoE has affected people for the better, not just for the service member, but the family."

— MARINE "C"



HEALING ARTS PROGRAM

Creative Arts Therapy refers to the use of creative expression through art, music, writing, dance, and other artistic modalities to improve the quality of life of an individual — psychologically, physically, and spiritually. Trained and credentialed clinicians, such as art, music, dance, and drama therapists facilitate group and individual sessions to achieve specific treatment goals across treatment settings.

At the NICoE, Creative Arts Therapists introduce patients to a range of new tools for processing and understanding themselves and their experiences. Creative Arts Therapies provide non-verbal vehicles for expression, and serve as powerful outlets for the invisible wounds of war. Patients who may not respond to traditional verbal therapies are provided the opportunity to explore new ways to express themselves, visually, musically, and through movement and writing. Reconnecting with family and others in a creative setting, processing difficult experiences through group interactions, or finding ways to tell personal stories through these expressive outlets has been shown to lead to improved quality of life for patients and families.

The NICoE serves as the lead partner in the National Endowment for the Arts (NEA) Military Healing Arts Partnership, a national initiative that seeks to advance the role of Creative Arts Therapies and other arts engagement programs in contributing to improved health and well-being for Service Members and family members confronting TBI and associated PH conditions. The NEA Military Healing Arts Partnership currently contributes a music therapist, art therapist, and two professional veteran writing instructors to the NICoE Healing Arts Program, who work alongside the NICoE's Healing Arts Program Coordinator.



National Geographic Magazine

The NICoE was featured in the February 2015 issue of National Geographic. The two-part cover story, “The Invisible War on the Brain,” begins with the personal accounts of several service members who have endured combat-related traumatic brain injuries. In “Behind the Masks: Revealing the Trauma of War,” their sobering stories carried a message of hope and healing through the treatment they received at the NICoE. Both the service members and the masks they painted in the Healing Arts Program are highlighted in the issue.



REFERRING PROVIDER ORIENTATION TO THE NICoE INTERDISCIPLINARY CARE MODEL

Patients are referred to the NICoE by practitioners throughout the MHS. In FY 2015, the NICoE provided 10 orientations and briefings to these referring clinicians. These sessions help build relationships across the MHS, increase collaboration efforts, enhance knowledge about the referral process, and teach the interdisciplinary care model of the NICoE so that it may have reach well beyond the WRNMMC campus.

“Your team is decades ahead of its time. The instant feedback and acknowledgement to these complex patients either rehabilitates a service member or gives him [or her] the treatment and tools needed to rebuild.”

REFERRING PROVIDER

The Joint Commission: A Clean Bill of Health

Surveyors from the Joint Commission (JC) inspected WRNMMC, including a visit to the NICoE in February 2015, after which both WRNMMC and the NICoE received an outstanding review. The JC visits healthcare facilities regularly to improve and strengthen patient safety efforts and build community confidence in the quality, safety, treatment, and services of the facility through its accreditation process.

Staff across the NICoE continuously maintain excellence through readiness and are actively engaged in leadership rounds, daily huddles, the JC tip-of-the-day emails, and other actions to ensure the highest-quality standards are in place at the NICoE. The hard work paid off when the NICoE specifically received commendations for its excellence and quality during the February inspection of WRNMMC.

NICoE EVALUATION TRACK

Since its inception, the NICoE has reviewed a number of cases in which the full four-week IOP was not possible or necessary for the patient, but a plan of care beyond a traditional, same-day outpatient support was required. The need for an in-depth evaluation-only program, was the driving force for development and piloting the NICoE Evaluation Track (NET).

In December 2014, the NICoE launched the NET pilot program with a small cohort of patients to gather baseline data. Outcomes and observations from this cohort are being used to refine the program for its launch in early FY 2016. Once launched, the NET will serve as a one-week program designed to clarify TBI diagnoses, identify highly-effective treatment recommendations for patients, and deliver the results and recommendation to home station referring providers for follow-up care. Ultimately, the goal of the NET program is to allow the NICoE to address a critical need for referring providers and their patients who require a detailed evaluation, or perhaps a re-evaluation, of their TBI and PH conditions.

INPATIENT SERVICES

As a part of WRNMMC, and in addition to its outpatient offerings, NICoE staff also assess and treat patients who are in an inpatient setting. The NICoE inpatient consult service team visits patients in wards and intensive care units supporting the diagnosis and treatment of those experiencing a TBI. This team is made up of a physician's assistant, nurse practitioner, psychologist, and neurologist. These NICoE experts provide diagnoses, help the attending or primary care team manage issues (e.g., agitation, confusion, psychological distress), create a discharge treatment plan for the patient, and work with the family to understand the nature of the patient's sustained TBI and the potential impacts of his/her injury.



EXPANDED SLEEP STUDY CAPABILITIES

Effectuated or disruptive sleep impacts the recovery and overall wellness of those seen at the NICoE. In 2015, the NICoE expanded its sleep study capabilities to include a third sleep technician, and now operates seven nights per week — up from five nights per week in 2014. Due to this increase in staff, the NICoE can now perform daytime sleep studies, including polysomnograms, multiple sleep latency tests (MSLT), maintenance of wakefulness tests (MWT), and Positive Airway Pressure (PAP) Naps. PAP Naps, which require two to three hours each, help desensitize patients who have anxiety about starting Continuous Positive Airway Pressure (CPAP) therapy. CPAP therapy is the leading therapy for obstructive sleep apnea.

The NICoE also supports Walter Reed's Sleep Laboratory by conducting sleep studies for TBI patients from WRNMMC and Fort Belvoir and providing follow-up care for patients.

Why Aren't You Sleeping Well, and How Do You Fix It?

DoD Live
August 17, 2015

Sleep problems very often accompany a TBI. The NICoE's Sleep Lab helps to diagnose these issues and provide solutions to patients.

NICoE IN THE NEWS



CORPSMEN: A PERSONAL TOUCH

Corpsmen are essential in providing continuity of care to patients and their families visiting the NICoE. In FY 2015, nine corpsmen, including senior enlisted leaders, performed patient intake evaluations, coordinated patient appointments and laboratory drawings for research studies, addressed patient questions and concerns, and oversaw Fisher House lodging accommodations for IOP patients.

“Corpsmen are hand-selected to serve at the NICoE, and are essential in providing continuity of care to patients.”

NAVY MASTER CHIEF PETTY OFFICER ALMA M. ROBINSON, SENIOR ENLISTED LEADER

NICOE OUTPATIENT SERVICES

The NICoE’s integration with WRNMMC consolidated its TBI resources under the NICoE umbrella. The addition of DVBIC’s TBI assets, coupled with the hospital-based assets, filled a need within the WRNMMC for continuous evaluation of combat casualties, ongoing TBI care and case management, and coordination of care with the Department of Veterans Affairs and other DoD facilities. This consolidation expanded the NICoE’s reach into the populations served by the TBI Service: active-duty, National Guard, and Reserve service members, veterans, and their adult beneficiaries with mild, moderate, severe, and penetrating TBI.

The NICoE’s TBI Outpatient Service operates from a flexible, patient-centric model that provides individualized care and treatment plans for as long as clinical demands require. NICoE Outpatient Services provide diagnoses of TBI and post-traumatic symptomatology, treatment, and case management services for each patient. Rehabilitation providers collaborate frequently to monitor and discuss patients’ treatment and progress. Treatments range from occupational and physical therapy to driving assessment and rehabilitation.

NICoE Integration into Walter Reed Improves Care After TBI

Health.mil
March 12, 2015

The NICoE integration with Walter Reed Bethesda, and resulting absorption of the hospital’s TBI Service, will provide benefits to the MHS.

NICoE IN THE NEWS

Patient Profile

RECEIVING RELIEF TO SERVE OTHERS

Navy Corpsman 3rd Class "G"'s whole world changed when a car accident ejected him from the vehicle, landing head first. This led to him experiencing numerous TBI symptoms: insomnia, severe headaches, poor focus, memory loss, severe back pain, and irritability. Despite his efforts, his symptoms seemed to worsen, and before arriving at the NICoE, he was hardly sleeping at all. He had started to feel anxiety when asked to do complicated tasks. He had difficulty focusing on his work, would "space out" during the day, and was exhausted by his lunch break.

Corpsman "G" came to the NICoE for help. While at the NICoE, he received physical therapy that improved his back pain. He also attended skills-based, cognitive rehabilitation classes, which taught him helpful tools and tactics for managing his memory loss and function more like his old self. The level of care he received impressed Corpsman "G": providers were familiar with his case and genuinely invested his success. Corpsman "G" worried he would not be able to stay on active duty after his injury, but with the support and resources he found at the NICoE, today, he is serving at WRNMMC, helping others along their path to wellness.

"After a long year of therapy, classes, studies, scans, etc., I can attribute almost all of my success in recovery to the wonderful people who have been a part of my team."

— CORPSMAN "G"



BRAIN FITNESS CENTER

Research has shown that the brain continues to grow and learn as we age. The Brain Fitness Center (BFC) provides service members and veterans the opportunity to use “brain fitness” programs to aid their cognitive rehabilitation. Cognitive dysfunction takes many forms including problems with focus and concentration, decision-making, and issues with recall of information.

As part of the 2015 integration, access to the BFC enables the NICoE to offer patients supplemental treatment options. Patients can choose to engage in computer-based brain training, biofeedback, and mind-body programs for cognitive rehabilitation and enhanced mental performance. The BFC also provides a forum for researchers to investigate the effects of computer-based brain training programs and how these treatment options can enhance other, more traditional cognitive rehabilitation options.

Service Members Use Brain Games for Memory, Attention Issues

DoDLive
September 25, 2015

The Brain Fitness Center helps patients address perceived cognitive deficits through the utilization of computer-based brain training software, and mindfulness through biofeedback.

NICoE IN THE NEWS

Patient Profile

BRAIN FITNESS CENTER PROVIDES MINDFUL TREATMENT OPTIONS

Army Staff Sgt. "B" experienced the benefits of the Brain Fitness Center (BFC) firsthand. After receiving two TBIs in Afghanistan, Staff Sgt. "B" began having auditory processing difficulties and issues with memory and problem solving. Using the BFC a few times a week as part of his recovery plan, Staff Sgt. "B" started to notice incremental improvements in his overall cognitive performance. He also demonstrated improvement in auditory processing after only a few months.

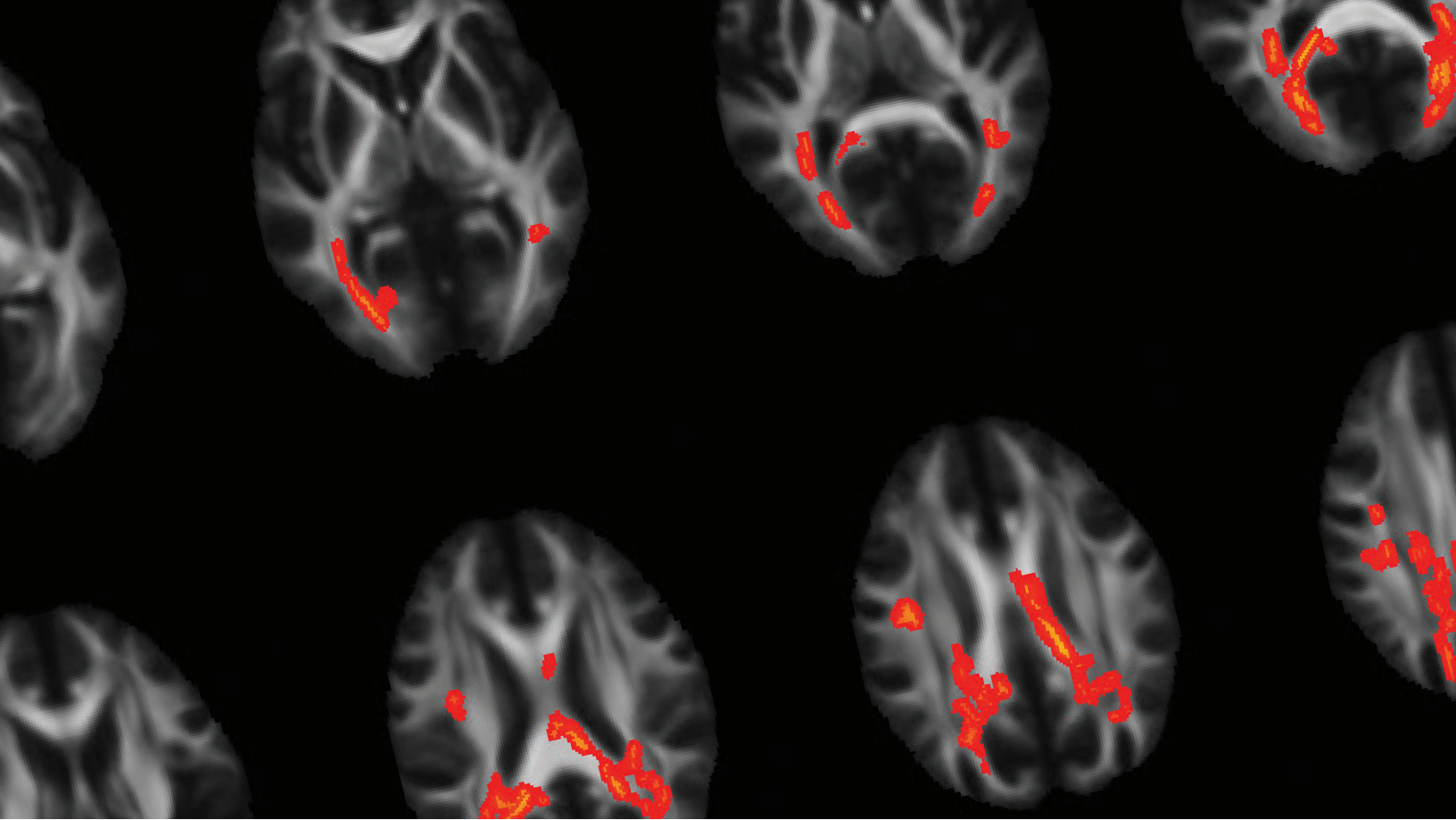
Brain training has become widely available with greater understanding of neuroplasticity and changes in neural synapses and brain pathways through environmental and behavioral changes. Games and smart phone applications promote brain growth through engaging activities, a foundation of the BFC.

Staff Sgt. "B"'s sessions typically last an hour. He warms up with computer-based brain games that he finds fun and engaging. Next, he uses another program tailored to his specific needs. This includes games that are progressively challenging and demand his deliberate effort to excel. In addition, Staff Sgt. "B" has attended a mind and body class and sometimes uses an isolation "pod", which allows him to work on coherence or heart rate variability. Staff Sgt. "B" also suffers from PTSD and has found that the pod is a great tool to regulate himself when experiencing stressors.

As Staff Sgt. "B" continues to take advantage of the BFC, he is steadily strengthening his abilities. He credits the BFC with expanding his awareness of treatment options and providing opportunities to try new things.

"The Brain Fitness Center has really been a turning point in my recovery. I feel that I get out of it what I put into it."

— STAFF SGT. "B",
INFANTRY SQUAD LEADER



NICoE Research Advances TBI and PH Care Across the MHS

A central component of the NICoE's mission is to improve diagnostic determination, evaluate novel treatment modalities, and explore the long-term consequences of TBI exposure on patients and their families. The NICoE model of integrating research and clinical care helps drive rapid advancement of clinical delivery and continuous evolution of the research strategy. Through collaborations with federal, academic, and private organizations, the research team uses the most advanced technical and clinical resources to evaluate and treat the effects of TBI and associated PH conditions.

RESEARCH SYNERGY BOARD

In FY 2015, the TBI RSB was established to create partnerships and leverage resources to enhance TBI research, scientific discovery, and clinical effectiveness. The RSB is comprised of representatives from USU, the NICoE, DVBIC, and several additional WRNMMC directorates. Dr. Louis French, deputy director for operations at the NICoE, co-chairs the RSB and ensures that the NICoE plays a key role in the RSB leadership and membership.

By placing an emphasis on translational research and building key collaborations and research partnerships, the RSB facilitates and promotes efficient use of existing and shared resources and provides guidance for common research issues among its members. The RSB plays a key role in the Institutional Review Board (IRB) process, oversight and evaluation of research proposals, and the creation of programs to ensure that the research protocols are consistent with the NICoE mission.

NICOE NETWORK RESEARCH PROGRAM

The NiCoE partners with Intrepid Spirit Centers and DVBIC to leverage research efforts and merge data to ensure coordinated TBI research efforts across the MHS. Information Technology systems are shared to encourage standardization of evaluation and outcome metric recording and analysis. The NiCoE Network Research Program (NNRP) is also designed to pilot advanced diagnostic capabilities to rapidly advance new findings in TBI research.

LONGITUDINAL DATA: THE 15-YEAR STUDIES

By tracking progress made by TBI patients and their families over time, the NiCoE hopes to evaluate long-term recovery and other effects from TBI treatment. This type of longitudinal research is not only critical for ensuring that therapies are effective, but that patients and families are able to sustain their health, wellness, and overall quality of life.

As a result of the 2015 integration, the NiCoE has been able to expand its longitudinal study capabilities by joining efforts with the 15-Year Studies, a congressionally-mandated set of TBI studies tasked to DVBIC. It consists of four projects separated into two categories: Natural History Studies and Caregiver Studies. The long duration of these studies enables unique benefits in how clinical researchers examine the impact of TBI on service members and their families.

NICOE CORE DATABASE PROTOCOL

This legacy research program leverages patients enrolled in the four week intensive outpatient treatment program, to collect multiple outcome metrics and clinical data elements to investigate patients suffering from the chronic effects of TBI exposure and comorbid psychological health conditions. The intent is to identify different disease states within the population for better characterization of this group of patients and more targeted patient centric care.

NEUROIMAGING: CONTINUING TO SET THE STANDARD FOR IMAGING RESEARCH

NiCoE researchers use neurological techniques to gather non-invasive measurements of brain structure and function, utilizing novel imaging technology to identify neurologic consequences of injury and persistent symptoms. Partnering with experts at Center for Neuroscience and Regenerative Medicine (CNRM) and the NIH, novel imaging modalities can rapidly be explored for determination of clinical and diagnostic utility.

Multiple images acquired from the more than 1,700 patients evaluated at NiCoE have yielded one of the most extensive sets of uniformly acquired MRI studies in the world. This dataset will only continue to improve as more patients are scanned and newer technologies and methods are implemented.

2015 Nelson Butters Award

Dr. Rael T. Lange, scientific director, 15-year Studies, received a Nelson Butters Award for Research Contributions to Clinical Neuropsychology for his article, "Diffusion Tensor Imaging Findings and Postconcussion Symptom Reporting Six Weeks Following Mild Traumatic Brain Injury." This award from the National Academy of Neuropsychology is presented to the paper deemed as the most influential scholarly paper published in the Archives of Clinical Neuropsychology.

RESEARCH PORTFOLIO HIGHLIGHTS

Funding research projects through supplemental grants allows the NICoE to expand collaborations, promote innovative research initiatives, and advance the clinical science for TBI and PH conditions research. In FY 2015, the NICoE received grant support for multiple research projects. Some key grants include the following:

A STUDY OF BILATERAL PREFRONTAL TRANSCRANIAL MAGNETIC STIMULATION (TMS) TO TREAT THE SYMPTOMS OF MILD TBI (MTBI) AND PTSD

This work is a collaboration with investigators at USU and WRNMMC that is funded within the CNRM. The purpose of this study is to investigate the tolerability of TMS to enhance the rehabilitation of service members with symptoms consistent with mTBI and comorbid PTSD symptoms. Additionally, exploratory work will be done to look at the neuronal and biological changes that may occur over the course of TMS treatment. The overall objective of this project correlates the efficacy and tolerability of TMS for mTBI and PTSD symptoms and treatment response with anatomical and biological factors unique to each service member.

ASSESSING THE IMPACT OF MTBI ON MULTISENSORY INTEGRATION WHILE MANEUVERING ON FOOT

This work is a collaboration with investigators at WRNMMC. This study evaluates auditory-visual-vestibular integration by measuring the localization error and reaction time required to identify a target with and without visual/audio cues in both static and walking conditions. The purpose of this study is to develop a sensitive test of multisensory integration that can be used to evaluate the functional performance of military personnel who have degraded sensory function due to blast-exposure. By designing a complicated task that requires auditory, visual, vestibular and proprioceptive sensory integration, investigators hope to be able to find a way to identify multisensory integration issues in blast-exposed patients that would be difficult or impossible to identify in current unimodal clinical tests of sensory function.

THE NATIONAL INTREPID CENTER OF EXCELLENCE CLINICAL RESEARCH DATABASE TO STUDY THE NATURAL HISTORY OF TRAUMATIC BRAIN INJURY AND PSYCHOLOGICAL HEALTH OUTCOMES IN MILITARY PERSONNEL

The primary objective of the NNRP project is to convert clinical information obtained from individuals evaluated and treated at the NICoE into a database with multiple dashboards that will facilitate research, clinical, and administrative evaluation. Key uses of this database will be the study of the natural history of TBI and PH issues in service members, the examination of trends of these conditions over time, determining the effectiveness of various treatments, the measurement of the availability and efficacy of services in the MHS, and the generation of new questions for future research on TBI and PH conditions. Collectively, this will entail the creation of a data registry with millions of data points, built-in applications to enable ongoing data collection from disparate sources, computational infrastructure, and the development of a virtual layer interface between the end user and the source data.

POTENTIAL UTILITY OF COGNITIVE AND VASOMOTOR EVALUATIONS DURING HYPOXIC STRESS FOR ASSESSMENT OF MTBI PATIENTS

"Normal" military performance includes many unavoidable stressors such as sleep deprivation, stress, and altitude-related reduced availability of oxygen. Clinical assessments, thus, when performed in tranquil clinic exam rooms may not adequately reflect cognitive impairments seen in highly stressful environments.

Findings from prior studies (Temme, Bleiberg et. al, 2013) indicate that persons with mTBI, who may appear perfectly normal when taking cognitive tests while breathing mean sea-level oxygen, may show worrisome cognitive abnormalities when breathing oxygen-equivalents of 12,000 feet and 13,000 feet. The purpose of the study is to identify cognitive deficits that may be apparent under conditions of stress. The stressor in this study, hypoxia, is commonly encountered by military and civilians. (The summit of the Arapahoe Basin, a skiing destination, starts at 13,997 feet.)

NATIONAL CAPITAL CONSORTIUM TBI NEUROIMAGING CORE PROJECT

Neuroimaging is the primary objective measure of TBI, yet large gaps of knowledge still exist regarding imaging findings, traumatic brain injury and clinical outcomes. The purpose of this study is to close the gaps and develop a state of the art center for imaging TBI. The major activities of this project have focused on protocol development, regulatory affairs, personnel hires, equipment purchases, laboratory space development, data acquisition, and development of image analysis procedures. Advanced neuroimaging data has been acquired on over 900 TBI subjects and 50 controls. We have found that the clinical MRI and PET scanners can provide a comprehensive set of neuroimages that allows for a superior diagnosis of

TBI compared to CT or standard MRI radiological images. The methods developed for this project were adopted by the DCoE, DVBIC, and VA for the development of CPG for imaging of TBI in the military. The advanced MRI scans can be acquired in under 2 hours and is well tolerated by >99% of mTBI patients. Single subject analysis for TBI can be accomplished by comparing each subject's scans from a series of modalities to population-average templates created from healthy control subjects' scans for each modality. Statistically meaningful measures can be made regarding the likelihood that observed anomalies within each scan differ significantly from a healthy control population. It was also discovered that the most common brain lesion in patients with mTBI are punctuate T2 hyperintense regions.

THE GRAMMY FOUNDATION FUNDS MUSIC THERAPY STUDY

In April 2015, the GRAMMY Foundation awarded \$20,000 to Drexel University's College of Nursing and Health Professions in collaboration with the NICoE to further research in the area of Music Therapy. The grant will fund a first-of-its-kind study to investigate the impact of listening to music and how it is associated with emotional regulation in service members with post-traumatic stress disorder (PTSD).

"This is an important academic collaboration for the non-medical modalities as part of our treatment plan," said COL Geoffrey Grammer, department chief of research, at the NICoE. "Aligning with the experts in this field helps us formalize and standardize the impact of these therapies on our patients."

RESEARCH COLLABORATION

The NICoE is proud to join with federal, academic, and private organizations to advance the science around TBI and PH conditions. In 2015, the NICoE expanded upon its key existing partnerships to further its mission in understanding and treating TBI and PH conditions. The NICoE collaborates with researchers at the following institutions:

- Center for Neuroscience and Regenerative Medicine
- Chronic Effects of Neurotrauma Consortium
- Department of Veterans Affairs
- Defense and Veterans Brain Injury Center
- Drexel University
- Fort Belvoir Community Hospital
- Harvard University
- The Institute for Rehabilitation and Research Memorial Hermann
- Intrepid Fallen Heroes Fund
- Kessler Foundation
- National Endowment for the Arts
- National Institutes of Health
- Naval Hospital Camp Pendleton
- Naval Medical Center San Diego
- Naval Medical Research Center
- Northwestern University
- U.S. Army Medical Research and Materiel Command
- U.S. Army Research Laboratory
- Uniformed Services University of the Health Sciences
- University of Michigan
- University of North Carolina
- University of Pittsburgh
- University of Utah
- Walter Reed Army Institute of Research

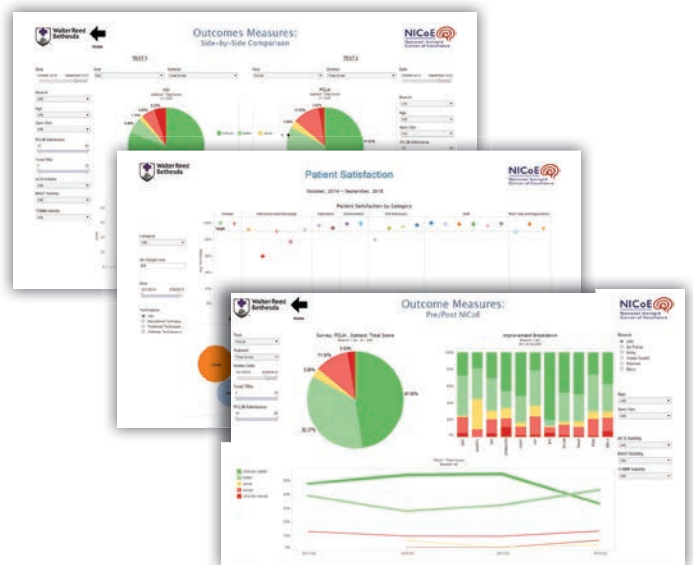


Informatics

At the NICoE, informatics serves a vital role in enabling computerized systems used by providers to track patient data and key outcomes in support of clinical care and research in the field of TBI. Two of the most critical systems are the NICoE Continuity Management Tool (NCMT) and the NICoE module of the Wounded Ill and Injured Registry (WIIR), which were launched in May 2014 and continued to advance in FY 2015. The NCMT facilitates tracking patient referrals and appointments within the NICoE, whereas the NICoE module of the WIIR serves to efficiently track patients' data long-term.

Additionally, the prioritization of treatment goals set forth by NICoE and their model for data collection heavily influences the Intrepid Spirit Centers. Informatics serves to standardize data collection to safeguard the integrity of data, facilitate research, and ensure that surveys and other clinical data are collected uniformly. Informatics also provides a data platform, which provides key information such as the nature of the injury and when the data was collected. Such consistency also allows researchers to easily review, integrate, and analyze the data. Finally, this standardization grants TBI experts access to large amounts of cohesive data, which is particularly important when looking for characteristics associated with very specific types of injuries or other highly detailed information.

The NICoE is setting the standard for clinical research informatics. Where researchers are often interested in quantitative data, clinicians generally provide more qualitative data when describing their patients' conditions. The Informatics team combines the detailed clinical information collected and documented by clinicians together with data from NICoE researchers. By leveraging all data collected, both researchers and clinicians get more in-depth insights, which allows for all those contributing to patient care to better understand the complexity of each patient's case.



NICOE CONTINUITY MANAGEMENT TOOL: CONNECTING CLINICAL AND RESEARCH INFORMATION

The NCMT was designed to support clinical and research operations at the NICoE. It supports the patient evaluation process from the time of the initial patient referral to discharge and follow-ups after the NICoE visit.

The NCMT allows multiple providers to review a patient's case and determine which program will be the most beneficial to him or her. Clinical staff then use the NCMT to design a tailored and comprehensive schedule, meeting the specific needs of the patient. Throughout the process, homogenous clinical data is collected using a set of standardized forms that put emphasis on the clinical elements that are relevant to effective evaluation and treatment of TBI. The system supports the aggregation, de-identification, and analysis of the data so different research protocols can leverage the clinical information for research purposes.

WOUNDED ILL AND INJURED REGISTRY

In an effort to more effectively connect clinical and research information, the NICoE leverages the WIIR to aid collection of standardized data directly from patients. During FY 2015, the NICoE continued to work closely with the Army Analytics Group to enhance the NICoE module on the WIIR that is used to collect longitudinal information for patients. The NICoE module within the WIIR has more than 35 standardized surveys that have improved the ability to collect outcome data without adding any significant burden to patients or providers. The robust, longitudinal dataset provides key outcome information about the progression of a patient during and after his/her NICoE visit. This data is also used to better understand the short- and long-term effects of mTBI, as well as provide metrics for further evaluation of the services and capabilities made available by the organization.

Data Analytics Key to Modernizing Military Health System

health.mil
April 21, 2015

Air Force Col. Albert Bonnema, chief of information delivery for the Defense Health Agency (DHA), held up the NICoE as an example of how the MHS is benefiting service members by utilizing big data collection (informatics).

NICoE IN THE NEWS

10 Government IT Projects Earn GCN Award Honorable Mentions

Government Computer News
October 5, 2014

NICoE informatics was given an honorable mention for a GCN Award.

NICoE IN THE NEWS



Educating the Next Generation and Sharing the NICoE's Impact

Contributing to the pipeline of clinicians and researchers is an ongoing commitment of the NICoE. Providing clinicians and researchers hands-on experience provides the NICoE an opportunity to influence care both within the MHS and civilian sectors, nationally and internationally. Student placements at the NICoE are highly sought after. Private organizations come to the NICoE seeking best practices. International bodies and medical leaders visit the NICoE to gain insight for building programs that incorporate parts of the NICoE model.

The NICoE welcomes visitors, students and dignitaries year-round. The programs that support this knowledge sharing are a cornerstone to communicating the NICoE story.

STAKEHOLDER EDUCATION

Historically known as the President's Hospital, WRNMMC is the flagship of the MHS and has a long standing tradition of delivering premier care to our nation's leaders, heroes, foreign military, and embassy personnel. This reputation, to which the NICoE contributes, draws visitors from around the world.

In addition to its unique care model, the NICoE's modern architecture, designed to contribute to the healing of patients, has become well-known throughout medical and military communities. In response to this interest, the NICoE offers tours to distinguished visitors, clinicians, researchers, and the public. In FY 2015, the NICoE hosted 113 official facility tours and countless other tours to increase awareness, understanding, and support among interested stakeholders looking for innovative, cutting-edge research, promising best practices, and proven results to improve TBI care.

ART THERAPY STUDENT STUDIO

The NICoE hosted its first Art Therapy Student Studio in June 2015 to introduce art therapy to undergraduate students and medical residents. This four-hour workshop is a new outreach program that promotes awareness of the impact art therapy has on service members.

Participants tour the facility, hear case studies, participate in an art activity such as mask-making, and meet the director of the NICoE. The success of this event will serve as the foundation for future workshops.

NICOE ACADEMIC PROGRAM

NICoE participates in the MHS Graduate Medical Education program to help train the next generation of health care professionals and instill interest in military medicine. There are two categories of experiential learning: Academic Credit and Professional Mentoring.

Experiential Learning for Academic Credit

Experiential learning opportunities for medical residents, interns, graduate, undergraduate, and high school students continue to be valuable for learning best practices from the NICoE. The NICoE offers two types of learning opportunities for academic credit:

- **Clinical Rotation:** The NICoE has a variety of disciplines for medical students and medical residents to actively participate in patient care. Trainees come from academic institutions that have Training Affiliation Agreements in place with WRNMMC.
- **Research Focus:** Residents from WRNMMC can elect to engage in a four-week research session through the NICoE. A sponsor in the NICoE research department guides them on the development of a research question, manuscript or poster.

Professional Mentoring for High School Through Undergraduate Students

The NICoE also has educational opportunities for students not seeking academic credit. Both of these programs expose students to military healthcare and can be tailored to a student's interest, allowing access to services across the campus to include the NICoE:

- **American Red Cross Research Assistant:** Students in high school through undergraduate who volunteer with the American Red Cross may be eligible to participate in an unpaid, 8–10 week summer internship at WRNMMC.
- **Student Clinical Observer Opportunity Program (SCOOP):** Students in high school through undergraduate can participate in this WRNMMC program that seeks to instill interest in the health sciences and military medicine.

ACADEMIC PROGRAM EXPANDS IN 2015

In FY 2015, 18 students participated in the Resident Program, and 17 students were professionally mentored or referred to NICoE for experiential learning.

Participating institutions included:

- Boston University
- Catholic University
- Drexel University
- George Washington University
- La Salle University
- Montgomery College
- Our Lady of Good Counsel High School
- Texas Christian University
- Uniformed Services University
- University of Baltimore
- University of Mary Washington
- University of Maryland
- University of North Carolina, Greensboro
- U.S. Naval Academy

Three new training affiliate agreements were initiated in FY 2015 with Drexel University (doctoral nursing student with art therapy focus), University of Southern California (neuropsychology), and University of Virginia (doctoral nursing research).

NICoE Intern Research Paper Wins Award

NICoE intern Edi Danalache was named by Intel Science Talent Search as a 2015 semifinalist for his paper, "A Cluster-Based Approach to Determine Subcategories of Mild Traumatic Brain Injury." Based on his work at the NICoE, Danalache was awarded \$1,000 scholarship from the Intel Foundation with an additional \$1,000 going to his school.



Facing Outward: Those Who Greet, Protect, and Serve Visitors to the NICoE

The clinicians, researchers, and staff at the NICoE provide unparalleled service to patients, families, and referring providers, but they are often not the first faces who greet them and make them feel welcome. The NICoE has dedicated staff and volunteers who interact daily with patients and their families and provide critical patient relations support.

American Red Cross volunteers and Patient Support Services staff are the first people patients and visitors meet when entering the building. They are the smiles and warm welcomes that set the initial tone for the patient experience at the NICoE, and they generously give their time each day in support of the NICoE mission.

The Warrior Cafe is a gathering place for patients, families, and staff. The NICoE also has other support staff who ensure patients, families, and visitors experience the warm and inviting hospitality of the organization. These individuals contribute to the seamless operation of the NICoE.

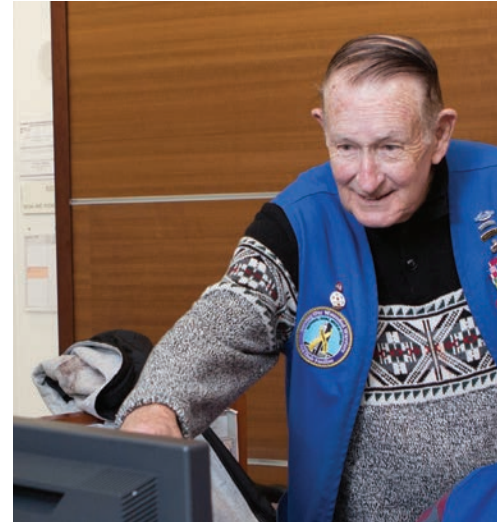


“I’m happy to be here; this is the best place to be. I enjoy spending time with the patients, sharing my language with everyone, and teaching the patients some Spanish.”

— MARIA GUEVARA, WARRIOR CAFE

RED CROSS VOLUNTEER OF THE YEAR

The American Red Cross named Col. (Ret.) Mike Duggan, U.S. Army, Volunteer of the Year. He began volunteering more than five years ago at the former National Naval Medical Center as a member of the Comfort Cart Team. While he loved providing support through his work with that program, he eagerly volunteered to join the NICoE team when they opened in October of 2010. Mike quickly became one of the friendly faces at the NICoE greeting patients, families, and visitors as they arrive, and he currently volunteers three days a week at the front desk. Along with many other Red Cross volunteers, he assists those visiting the NICoE with anything they need. In 2015, Mike volunteered nearly 600 hours, and in 2014, he volunteered more than 500 hours. The NICoE is grateful to Mike and all the American Red Cross volunteers who serve the patients, families, visitors, and staff every day.



NICOE'S PATIENT SUPPORT SERVICES: BLUE COATS AND HELPFUL FACES

"We as 'Blue Coats' are here to serve as Patient Support Services liaisons for the NICoE and Walter Reed. We're here to assist patients and families, as well as the staff. Each and every day, we strive to serve with professionalism, courtesy, and initiative. Our jobs are very rewarding as we enjoy helping and aiding service members, who protect and serve our great nation, and their families, who also sacrifice for our country."

— WILLIAM CRAMER AND ANTHONY PUCHON HAVE SERVED AT THE NICoE FOR FOUR YEARS.



Promoting the NICoE Staff: Expertise, Recognition, and Community Contribution

NICoE staff are active organizational ambassadors through their various contributions to the larger MHS, civilian, and academic communities. In FY 2015, NICoE staff shared clinical research findings and expanded knowledge about TBI and PH conditions through a variety of activities. They published and contributed to journal articles, presented research posters at professional conferences, and participated in lectures. (A complete list can be found in the appendix.) They also served in working groups and advisory boards and participated in professional and community organizations. These contributions serve to extend NICoE clinical and research insights, outcomes, and lessons-learned into the broader community.

In FY 2015, NICoE staff engaged through working groups, advisory boards, and other events, including, but not limited to:

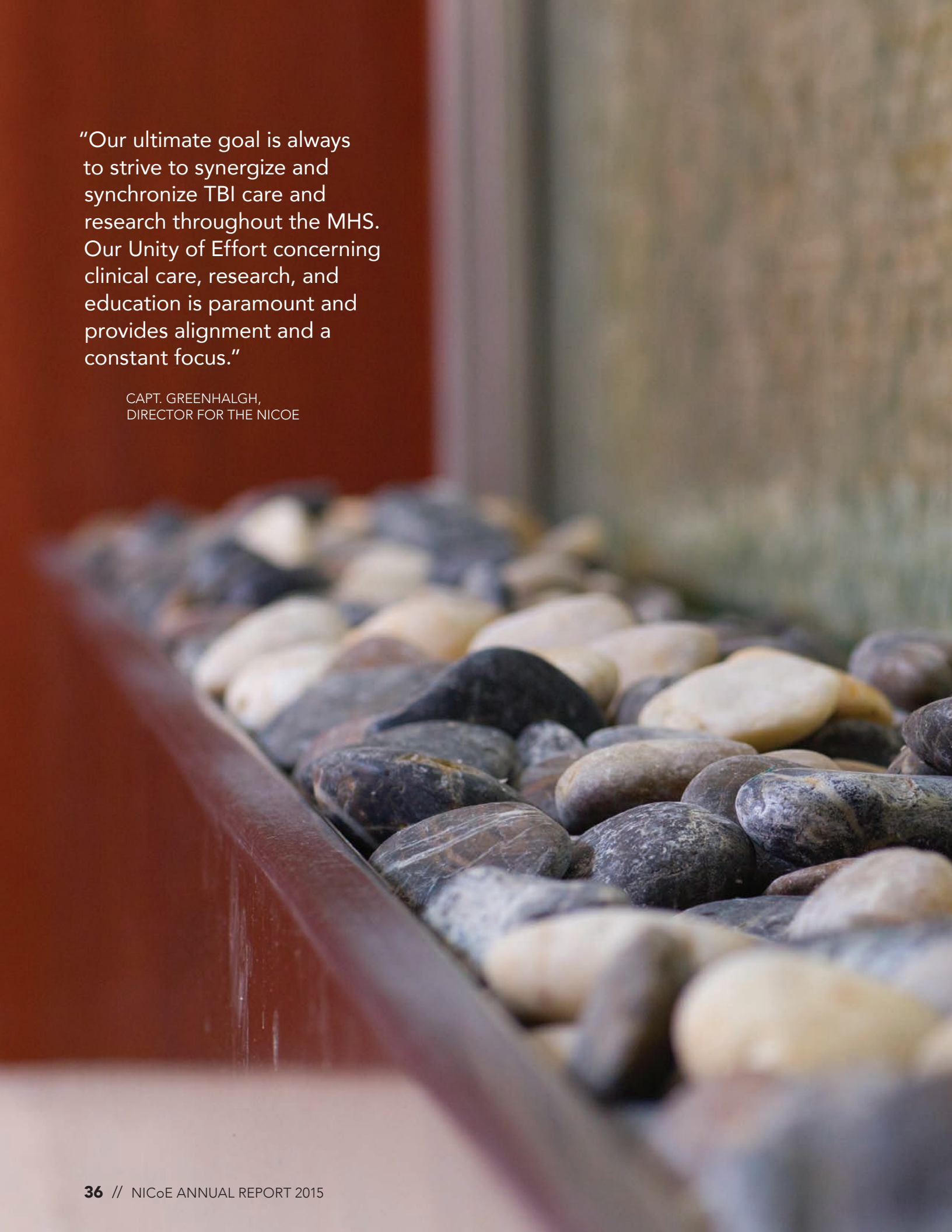
- DCoE TBI Symposium, September 2015
- DoD, PH/TBI Registry Working Group, Summer 2015
- DVBIC Post-Traumatic Headache Disorder Clinical Guidelines
- Federal Interagency Traumatic Brain Injury Research National Database: Strategic Vision Steering Committee
- Military Health Systems Governance TBI Advisory Committee
- National Board Steering Committee, National Institutes of Health
- National Institute of Neurological Disorders and Stroke, Common Data Elements
- International State of Science Meeting on the Biological Basis for Blast-Related Chronic Traumatic Encephalopathy, November 2015
- International TBI CDE FDA Compliance Working Group
- VA/DoD mTBI Clinical Practice Guidelines Expert Panel
- VA State of the Science Symposium on Traumatic Brain Injury, August 2015

NICoE Nurse Honored with National Daisy Award

Pamela Quinn, RN, a clinical nurse at the NICoE, was the recipient of the June 2015 DAISY (Disease Attacking the Immune System) Award, which was created by the family of James Patrick Barnes in 1999 as a way to show appreciation of the nursing care they received during his hospitalization. DAISY Award recipients are nominated for this national honor by their colleagues.

"[Pamela] routinely goes above and beyond normal position requirements to ensure that her patients receive excellent care," said fellow NICoE colleague and Clinical Social Worker Krista Argliolas. She considers Quinn a role model and valued colleague who "embodies the concepts of patient-centered care and best practice."





“Our ultimate goal is always to strive to synergize and synchronize TBI care and research throughout the MHS. Our Unity of Effort concerning clinical care, research, and education is paramount and provides alignment and a constant focus.”

CAPT. GREENHALGH,
DIRECTOR FOR THE NICOE

The Way Forward

Over the next year, the NICoE will continue to strive to be a global leader in TBI care, research, and education. Guided by a revised strategic plan and inspired by its FY 2015 accomplishments, the NICoE's dedicated staff looks forward to building partnerships, furthering research discoveries, providing excellent patient care, and sharing best practices.

The NICoE will also continue to focus on the long-term priorities of the MHS, including a collective emphasis on quality patient care. Providing outstanding treatment and clinical care remains the highest priority moving into FY 2016. Staff and leadership will continue to utilize and streamline the organization's expanded capabilities and communicate the organization's successes and findings. The NICoE is committed to continuing its standard of excellent care and innovative research to improve the lives of affected service members and their families. With the WRNMMC emphasis on creating and maintaining its status as a High Reliability Organization (HRO), the NICoE stands at the forefront in this effort, practicing the tenants of a HRO in its daily activities.

Within the research and development realm, the NICoE will further develop and strengthen collaborative efforts within the MHS and academic institutions across the country. Partnering with other institutions like USU and NIH, while sustaining the NICoE's internal research efforts, will allow the organization to deliver relevant data, findings, and other information to the larger TBI community.

Moving forward into FY 2016, the NICoE looks to leverage its databases that have been populated with clinical care data over the past five years. NICoE researchers seek to answer some of the pressing questions surrounding TBI and its manifestations for those affected. Trends and patterns that demonstrate the utility of care at the NICoE are emerging and will hopefully aid clinicians and researchers to better understand the disease state, post-traumatic physiology, and how they can be treated.

The NICoE's Strategic Goals Continue to Frame the Way Forward

Goal 1:

Provide high-quality patient-centered treatment and services, addressing physical, mental, and spiritual well-being across the **continuum of TBI care**

Goal 2:

Drive **research** to build understanding of the complex nature of TBI and PH conditions and treatments

Goal 3:

Advance patient care and **educate** patients, families, staff, and the next generation of clinicians and researchers by leveraging the NICoE's accumulated knowledge of TBI diagnosis and treatment

Goal 4:

Develop a work environment that invests in **staff engagement** and values a competent and committed workforce

Goal 5:

Promote the **value** of the NICoE to the MHS and the global community

NICoE Works and Contributions

The following highlights works and contributions completed in FY 2015, and showcases the significant efforts of the NICoE.

JOURNAL ARTICLES

Bogner, J., French, L. M., Lange, R. T. & Corrigan, J. D. (2015). Pilot study of traumatic brain injury and alcohol misuse among Service members. *Brain injury*, 29(7–8), 905–914.

Caban, J. J. & Gotz, D. (2015). Visual analytics in healthcare — opportunities and research challenges. *Journal of the American Medical Informatics Association*, 22(2), 260–262.

Carlozzi, N. E., Kratz, A. L., Sander, A. M., Chiaravalloti, N. D., Brickell, T. A., Lange, R. T., ... Tulsy, D. S. (2015). Health-related quality of life in caregivers of individuals with traumatic brain injury: Development of a conceptual model. *Archives of Physical Medicine and Rehabilitation*, 96(1), 105–113.

Clark, C., Cole, J., Winter, C., Williams, K. & Grammer, G. (2015). A review of transcranial magnetic stimulation as a treatment for post-traumatic stress disorder. *Current Psychiatry Reports*, 17(10), 1–9.

Dretsch, M. N., Bleiberg, J., Williams, K., Caban, J., Kelly, J., Grammer, G. & DeGraba, T. (2015). Three scoring approaches to the neurobehavioral symptom inventory for measuring clinical change in Service members receiving intensive treatment for combat-related mTBI. *The Journal of Head Trauma Rehabilitation*. Advanced online publication. doi: 10.1097/HTR.000000000000109.

Dretsch, M. N., Kelly, M. P., Coldren, R. L., Parish, R. V. & Russell, M. L. (2015). No significant acute and subacute differences between blast and blunt concussions across multiple neurocognitive measures and symptoms in deployed soldiers. *Journal of Neurotrauma*, 32(16), 1217–1222.

Dretsch, M. N., Silverberg, N. D. & Iverson, G. L. (2015). Multiple past concussions are associated with ongoing post-concussive symptoms but not cognitive impairment in active-duty army soldiers. *Journal of Neurotrauma*, 32(17), 1301–1306.

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LECTURES

- DeGraba, T. (2015, May). *Research findings update from the NICoE*. Presentation at the American Psychiatric Association 168th Annual Meeting, Toronto, Ontario, Canada.
- DeGraba, T. & Grammer, G. G. (2015, February). *Creative arts therapies in interdisciplinary care at National Intrepid Center of Excellence (NICoE) facilities*. Presentation at the National Initiative for Arts & Health in the Military, Third National Summit: Advancing Research in the Arts for Health and Well-being across the Military Continuum, Washington, DC.
- Dretsch, M. (2015, May). *Association of brain-derived neurotrophic factor polymorphisms, traumatic stress, mild traumatic brain injury, and combat exposure with posttraumatic stress disorder in U.S. soldiers returning from deployment*. Presentation at the American Psychiatric Association 168th Annual Meeting, Toronto, Ontario, Canada.
- French, L. M. (2015, May). *Mild TBI and co-morbidities in military populations*. Presentation at the American Psychiatric Association 168th Annual Meeting, Toronto, Ontario, Canada.
- Grammer, G. (2015, May). *NICoE research infrastructure and strategic research plan*. Presentation at the American Psychiatric Association 168th Annual Meeting, Toronto, Ontario, Canada.
- Greenhalgh, W., Sullivan, K., Walker, M. & DeGraba, T. (2015, September). *TBI pathway of care on America's health campus*. Presentation at the 2015 Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury Summit, Falls Church, VA.
- Kelly, J. (2015, May). *Care of patients with mild traumatic brain injury and comorbid psychological health conditions*. Presentation at the American Psychiatric Association 168th Annual Meeting, Toronto, Ontario, Canada.
- Mirsky, A. F. (2015, May). *A history of research on the neuropsychology of impaired attention*. Presentation at the Rehabilitation Center, Clinical Center, National Institutes of Health, Bethesda, MD.
- Sullivan, K. (2015, November) *Military mental health*. Invited Lecture at BrainFutures 2015 Centennial Conference of the Mental Health Association of Maryland Virtual conference. Annapolis, MD.
- Sullivan, K. (2015, November) *Best practices to navigate and implement the emerging brain health toolkit*. Invited Lecture at Sharpbrains Virtual Summit 2015: Monitoring & Enhancing Brain Health in the Pervasive Neurotechnology Era. Presented from Bethesda, MD.
- Sullivan, K. (2015, November) *Overview and updates from the Brain Fitness Center at Walter Reed National Military Medical Center*. Invited Lecture at Center for Brain Health, Dallas, TX.

POSTERS

- Bailie, J. M., Lange, R. T., Kennedy, J. E., French, L. M., Graves, W., Powell, B. & Brickell, T. A. (2015, November). *Interaction between gender and PTSD on the outcome from military related TBI in the military*. Poster session presented at the 35th Annual Conference of the National Academy of Neuropsychology, Austin, TX.
- Bickett, C., Williams, K. Cole, J., Grammer, G. & Dretsch, M. (2015, August). *The potential of polypharmacy side effects complicates assessment of symptoms associated with complex mild traumatic brain injury*. Poster session presented at the Military Health System Research Symposium, Fort Lauderdale, FL.
- Brickell, T. A., Lange, R. T., Graham, A., Gartner, R., Driscoll, A., Li, Z., ... French, L. M. (2015, November). *Psychological resilience and health-related quality of life following mild TBI in U.S. military Service members*. Poster session presented at the 35th Annual Conference of the National Academy of Neuropsychology, Austin, TX.
- Brickell, T. A., Lange, R. T., Tulskey, D. S. & French, L. M. (2015, February). *Influence of symptom validity test performance on the traumatic brain injury quality of life (TBI-QOL) scale in U.S. military Service members*. Poster session presented at the 43rd Annual Journal of the International Neuropsychological Society, Denver, CO.
- Butler, J., Hoover, P., Gager, P., Brooks, P. & Caban, J. (2015, March). *Validation of the Neurobehavioral Symptom Inventory: Correlating subjective response against clinical diagnoses*. Poster session presented at the National Capital Area TBI Research Symposium, Bethesda, MD.
- Cord L., Law W., Marble S., Kensky S., Arbogast A. & Sullivan K., (2015, November). *Participation in heart rate variability and mindfulness skills training in military patients seeking cognitive improvements*. Poster session presented at the American Speech Language Hearing Association Annual Convention, Denver, CO.
- DeGraba, T., Popescu, M., Popescu, A., Mikola, J., Dretsch, M. & Hughes, J. (2015, August) *Reductions in event-related activation of dominant hemisphere association cortex during lexical retrieval in mTBI patients with residual cognitive deficits*. Poster session presented at the Military Health System Research Symposium, Fort Lauderdale, FL.
- Duncan C. C. (2015, September). *A potential risk marker of PTSD: Visual brain potentials are associated with PTSD in wounded warriors*. Poster session presented to the Department of Defense Congressionally Directed Medical Research Programs, Frederick, MD.
- Eierud, C. & Riedy, G. (2015, August). *Mild traumatic brain injury associations between radiological findings and neurobehavioral symptoms using permutation test and support vector regression*. Poster session presented at the 2015 International Conference on Brain Informatics and Health, London, UK.
- French, L. M., Brickell, T. A., Graham, A., Gartner, R., Driscoll, A., Li, Z., ... Lange, R. T. (2015, February). *Neuropsychological outcome from military-related traumatic brain injury (TBI): Preliminary analyses of the role of resilience, TBI severity, and blast exposure*. Poster session presented at the 43rd Annual Journal of the International Neuropsychological Society, Denver, CO.
- Graner, J., Oakes, T. R., Reinhardt, L., Liu, W., Yeh, P., Senseney, J., ... Riedy, G. (2015, June). *fMRI response to emotional faces in military TBI with and without structural neuroimaging findings*. Poster session presented at the Human Brain Mapping Annual Meeting, Honolulu, HI.
- Hammett, R., Senseney, J., Oakes, T. & Riedy, G. (2015, June). *Software tool for loading traumatic brain injury neuroimage data into an external repository*. Poster session presented at the 33rd Annual National Neurotrauma Symposium, Sante Fe, NM.
- Highland, K., Kruger, S. & Roy, M. (2015, March). *If you build it, they will come, but what will wounded warriors experience?* Presence in the CAREN. Poster session presented at the National Capital Area TBI Research Symposium, Bethesda, MD.
- Konara, R., Williams, K., Cole, J., Fuller, L., Grammer, G. & Dretsch, M. (2015, March). *Medication profiles of Service members with chronic traumatic brain injury sequela*. Poster session presented at National Capital Area TBI Research Symposium, Bethesda, MD.
- Kubli, L. R., Mirsky, A. F., Resnick, J. B., Mills, C., French, L. F. & Duncan, C. C. (2015, March). *Deficits in auditory and visual attention after traumatic brain injury*. Poster session presented at the National Capital Area TBI Symposium, Bethesda, MD.
- Lange, R. T., Brickell, T.A., Graham, A., Gartner, R., Driscoll, A., Li, Z., ... French, L. M. (2015, February). *Examination of the 'Mild Brain Injury Atypical Symptoms' and 'Validity-10' scales to detect symptom exaggeration in U.S. military Service members*. Poster session presented at the 43rd annual Journal of the International Neuropsychological Society, Denver, CO.
- Lange, R. T., Iverson, G.L., Arrieux, J. P., Dennison, E. M., Bailie, J., Ivins, B. & Cole, W. R. (2015, November). *Non-specificity, and some instability, of 'Postconcussion-like' symptom reporting in a healthy U.S. military sample*. Poster presented at the 35th Annual Conference of the National Academy of Neuropsychology, Austin, TX.
- Lippa, S. M., Lange, R. T. & Axelrod, B. N., (2015, November). *Utility of the Mild Brain Injury Atypical Symptoms (MBIAS) scale in a mixed clinical sample*. Poster session presented at the 35th Annual Conference of the National Academy of Neuropsychology, Austin, TX.
- Lippa, S., Lange, R., Bhagwat, A. & French, L. (2015, June). *The clinical utility of the repeatable battery for the assessment of neuropsychological status effort index and effort scale in patients following mild TBI*. Poster session presented at the American Academy of Clinical Neuropsychology, San Francisco, CA.
- Lippa, S. M., Lange, R. T. & French, L. M. (2015, November). *Clinical utility of embedded performance validity tests on the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) following mild traumatic brain injury*. Poster session presented at the 35th Annual Conference of the National Academy of Neuropsychology, Austin, TX.
- Liu, W., Pacheco, J., Eierud, C., Joy, D., Senseney, J., Yeh, P. H., ... Riedy, G. (2015, June). *Dynamic susceptibility contrast perfusion imaging revealed asymmetric cerebral blood flow in chronic TBI patients*. Poster session presented at the International Society for Magnetic Resonance in Medicine 23rd Annual Meeting, Toronto, Ontario, Canada.

- Liu, W., Soderlund, K., Senseney, J., Yeh, P., Ollinger, J., Graner, J., ... Riedy, G. (2015, June). Imaging of cerebral microhemorrhages in military Service members with chronic traumatic brain injury. Poster presented at the Human Brain Mapping Annual Meeting, Honolulu, HI.
- Mikola, J., & Nousak, J. (2015, November). *Auditory attention and hearing deficit in active duty Service members with mild traumatic brain injury and psychological health conditions*. Poster session presented at the Annual American Speech Language Hearing Association Convention, Denver, CO.
- Mirsky, A. F., Levav, M., Greenberg, D. A., French, L. M. & Duncan, C. C. (2015, February). *Gender differences in sustained attention in idiopathic generalized epilepsy*. Poster session presented at the 43rd Annual Meeting of the International Neuropsychological Society, Denver, CO.
- Nathan, D., Sreenivasan, R., Bellgowan, J., Liu, W., Eirud, C. Sham, E., ... Riedy, G. (2015, June). *Resting state fMRI causal networks in mild traumatic brain injured subjects*. Poster session presented at the Human Brain Mapping Annual Meeting, Honolulu, HI.
- Nathan, D., Sreenivasan, R., Bellgowan, J., Liu, W., Eirud, C. Sham, E., Joy, D., Kubli, A., Yeh, P., Senseney, J., Oakes, T., French, L. & Riedy, G. (2015, June). *Graph theoretic measures reveal potential thalamic biomarker for moderate TBI in resting state fMRI*. Poster session presented at the Human Brain Mapping Annual Meeting, Honolulu, HI.
- Nathan, D. & Riedy, G. (2015, September) *Decision tree classifiers in multimodal imaging of traumatic injury*. Poster session presented at the 2015 International Conference on Brain Informatics and Health, London, UK.
- Neuges, D., Williams, K., Wong, L., Razumovsky, A., Yam, P., Dretsch, M., Grammer, G. & DeGraba, T. (2015, March). *Transcranial doppler measure of persistent cerebral vasomotor reactivity abnormality in service members with chronic mTBI*. Poster session presented at National Capital Area TBI Research Symposium, Bethesda, MD.
- Nousak, J., Wong, L., Williams, K. & DeGraba, T. (2015, July). *Prevalence and sensitivity for hearing problems in Service members with mild traumatic brain injury and psychological health conditions*. Poster session presented at Military and Veterans Health after a Decade of War Conference, Washington DC.
- Ollinger, J., Hurley, S., Alexander J. & Riedy, G. (2015, July) *A constrained estimator of myelin water fraction from steady state data*. Poster session presented at International Society for Magnetic Resonance in Medicine Annual Meeting & Exhibition, Salt Lake City, UT.
- Onakomaiya, M., Kruger, S., Highland, K. & Roy, M. (2015, August). *Validating the CAREN as a clinical assessment tool for mild TBI and PTSD: A preliminary findings using three virtual environments*. Poster session presented at the Military Health System Research Symposium, Fort Lauderdale, FL.
- Santhanam, P., Yeh, P. H., Kharlamova, A., Searing, E., Graner, J., Oakes, T., ... Weaver, L. (2015, June). *Central auditory processing disorders after mild traumatic brain injury*. Poster session presented at the Human Brain Mapping Annual Meeting, Honolulu, HI.
- Seibert, L., Lange, R. T., Kennedy, J. E., Duckworth, J., Brickell, T. A., French, L. M. & Bailie, J.M. (2015, February). *Effect of body orientation to blast on risk of post concussive symptoms among active duty Service members*. Poster session presented at the 43rd annual Journal of the International Neuropsychological Society, Denver CO.
- Settle, J. R., Resnick, J. B., McFarland, A. B., Auslander, M.V., Clawson, D. M., Sebrechts, M. M., ... Duncan, C. C. (2015, March). *Prospective memory in mild traumatic brain injury*. Poster session presented at National Capital Area TBI Symposium, Bethesda, MD.
- Sullivan, K. A., Lange, R. T. & Edmed, S. L. (2015, November). *Utility of the Neurobehavioral Symptom Inventory-Validity-10 index to detect symptom exaggeration*. Poster session presented at the 35th Annual Conference of the National Academy of Neuropsychology, Austin TX.
- Tamoria, N., Yeh, P. H., Oakes, T., Grammer, G. & Riedy, G. (2015, May). *Diffusion tensor imaging in military blast exposure resulting in mTBI and PTSD: A case report*. Poster session presented at the American Psychiatric Association 168th Annual Meeting, Toronto, Ontario, Canada.
- Williams, K., Staver, T., Wong, L., Lange, R., Gajer, A., ... Dretsch, M. (2015, August). *Clinical utility of the Validity-10 for detecting symptom exaggeration in patients with complex mild traumatic brain injury*. Poster session presented at Military Health System Research Symposium, Fort Lauderdale, FL.
- Wong, L., Williams, K., Razumovsky, A., Dretsch, M., Grammer, G., Neuges, D. & DeGraba, T. (2015, June). *Transcranial Doppler measures effects of mind-body training on cerebral autoregulation in Service members with combat related TBI*. Poster session presented at the 33rd Annual National Neurotrauma Symposium, Santa Fe, NM.
- Yam, P., Williams, K., Dretsch, M., Neuges, D., Grammer, G., Kappes, E. & DeGraba, T. (2015, May). *Trends in vascular response in patients with traumatic brain injury*. Poster session presented at the American Psychiatric Association 168th Annual Meeting, Toronto, Ontario, Canada.
- Yeh, P. H., Harper, J., Sham, E., Mielke, J., Staver, T., ... Riedy, G. (2015, June). *White matter disruption and brain iron content associated with comorbidity of depression and traumatic brain injury*. Poster session presented at the Human Brain Mapping Annual Meeting, Honolulu, HI.

Original expressions of patients in their journey toward restoring hope and healing...

BLOOM WHERE WE ARE PLANTED



Wounded, sick, ill or injured
The weeds overtake us
The wind takes our seeds and
Sends us to new areas.
Basking in the sun — we live in new moments
And as we grow, our roots take hold
And we bloom where we are planted.
As the sunlight appears
A new opportunity takes shape.
We grow strong trying to push
the weeds away
Sometimes we overcome
Others we wait for a new day
And we bloom where we are planted.
Overtaken by the weeds overtaken
by the darkness.
The flower struggles to survive.
The garden rallies to support our lives
As we continue to grow and thrive
And we bloom where we are planted.
New hope breaks on the dawn of a new day
Instead of sunshine, this time we have rain
Watering our roots so that we may
Bloom where we are planted.

THE WALK

The mask sits in flux against the backdrop
of space and time
The green emerald stone stands out
in the forefront of my imagination
And speaks to me through sound waves
of light and effervescence
There are no hands for me to reach up to the heavens
For I have already arrived here —
the place that I now call home
When did it happen and how did I arrive here?
It really ought not to matter
Because this feeling here is superior
to the greatest rest that I could ever
attain and store down on earth
Yeah, something pretty spectacular has
transformed and replaced the blood,
Which gave me life to a stardust, which now
holds me in suspense, glistening in
Ebullience with a greater understanding
of the things to come.

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