

Why military neurorehabilitation research is relevant to everyone

David X. Cifu^{a,*} and Sidney R. Hinds II^b

^a*Department of Physical Medicine and Rehabilitation, School of Medicine, Virginia Commonwealth University, Richmond, VA, USA*

^b*Department of Radiology and Neurology, Uniformed Services University, Bethesda, MD, USA*

We are proud to have organized and edited this military special issue of *Neurorehabilitation*, where you will find relevant and timely information on the latest and most clinically germane neurorehabilitation issues facing clinicians and researchers working with active duty and veterans service members (i.e., military) in the fields of polytrauma, TBI, psychological health, and the array of coexisting and comorbid injuries and illnesses that are seen. During the development of the issue, we asked, “*Why are military neurorehabilitation clinical care and research relevant?*” and we found that the answers lie in the dynamic relationship of military, veteran and civilian health systems. Since September 11th, 2001, the federal government and in particular the Department of Defense (DoD) and the Department of Veterans Affairs (VA) have committed tremendous amounts of money, person-hours, and time to address the gaps in clinical and research knowledge related to the acute management, short-term effects and long-term outcomes of combat injuries and illnesses. This underscores the cyclical learning processes that occur during times of peace and of conflict. Depending on the military state of the world, science and medical advancements lean toward either civilian (“academic”) or toward the military arenas. In the past quarter century, we have seen advancements in neurorehabilitation medical research and clinical care prompted by the needs of DoD or VA. Federal funding

has infused intramural and extramural research, clinical endeavors and even societal activities to provide solutions to the diverse, extensive needs associated with traumatic brain injury, psychological health, and polytrauma, with a special emphasis on neurological health.

One of the tenets of successful delivery of military health care has been to provide the highest quality care to service members and veterans that meets or exceeds the existing standards of care in the attempt to optimize the fighting force and advance the standards. In achieving this, “centers of excellence” (CoE’s), such as the military’s TBI or Psychological Health CoE’s of the VA’s Polytrauma System of Care, have striven to incorporate evidence-based and evidence-informed best practices into clinical care models. This process entails public and private collaborations to create and implement clinical recommendations and practice guidelines that include not only experts from the federal government but also heavily recruiting and relying on those civilian experts in private and academic practices and centers of research. When clear clinical solutions are not available or cannot be agreed upon by these combined subject matter experts (SME’s), research is stimulated. This special issue highlights the work and outputs from some these collaborative neurorehabilitation partnerships, particularly those centered around TBI and head injury, identifying their impact in advancing clinical care in the past, present and the future. Research supported by the Defense Health Agency (DHA), the Office of Research & Development (ORD) of the Veterans Affairs, the United States Army Medical

*Address for correspondence: David X. Cifu, M.D., Department of Physical Medicine and Rehabilitation, School of Medicine, Virginia Commonwealth University, Richmond, VA, USA. E-mail: david.cifu@vcuhealth.org.

Research and Development Command, the Congressionally Directed Medical Research Programs (CDMRP), the National Institutes of Health (NIH), and the National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR)) have informed, influenced, and funded many of the authors showcased in this special issue.

This military special issue offers research updates, evidence summaries and clinical highlights from practitioners and researchers who work directly with service members and veterans. Key researchers and leaders from the TBI Center of Excellence (TBI-CoE), formerly known as the Defense and Veterans Brain Injury Center (DVBIC), collaborated for this special issue with colleagues from the Long-term Impact of Military-relevant Brain Injury Consortium – Chronic Effects of Neurotrauma Consortium (LIMBIC-CENC) to summarize the impacts of sleep, nutrition, biomarkers in the management of traumatic brain injury recovery. Authors associated with TBI-CoE, the National Intrepid Center of Excellence for TBI with Psychological Health (NICoE), and Intrepid Spirits provide lessons learned on how to deliver multidisciplinary and interdisciplinary TBI care. Each of these authors are pivotal in providing a learning health system to improve the quality of this type of multidisciplinary care.

Walker et al., Hammer et al., and Warner et al. are military researchers actively conducting research on risk-factors and co-existing injuries that, if not addressed, will adversely affect recovery and contribute to long term sequelae from combat trauma.

Other investigators in this issue, including Barnett et al. and Monti et al., explore common questions regarding how the consequences of TBI, including neuroendocrine deficiencies, nutrition, diet, and the gut-brain axis, impact recovery from TBI. Hinds and Cifu discuss how the COVID-19 pandemic affected both longitudinal TBI research and how clinicians and clinical researchers may have had to adjust their approach to chronic outcomes after TBI in the face of “Long COVID” and post-COVID symptoms. Springer et al., and Dunn et al. explore ways to approach military patients with psychological health issues with novel interventional means including stellate ganglionic block and 3,4-Methylenedioxymethamphetamine (MDMA), which some have suggested offer impactful options for those suffering from post-traumatic stress alone and those with the challenges of both post-traumatic stress and TBI. While many of these research advances are in limited clinical use today, they may represent innovative bridges to future care.

While this military special issue only offers a slice of the exhaustive gamut of available military neurorehabilitation topics, we are confident that the reader will gain a better appreciation for the uniquely complex nature of military neurorehabilitation and are hopeful that it will stimulate thought-provoking ideas that may lead to even greater advances in the field and even further improvements in elevating the standards of clinical care provided to America’s service members and veterans.