

Center for the Study of Traumatic Stress

2019 Annual Report



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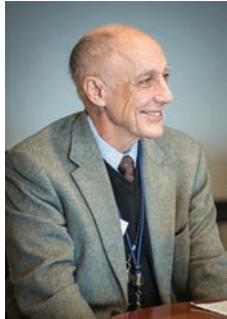
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“...the Center’s attention is presently targeted to the COVID-19 pandemic as well as our ongoing work on post-traumatic stress disorder (PTSD), traumatic brain injury (TBI), suicide and suicide-related behavior, and disaster response and preparedness.”

— Dr. Robert J. Ursano

From the Director

Dear Center Colleagues and Friends,



As we think of this year, let me first frame our Center and its work. The Center for the Study of Traumatic Stress (CSTS) is an integral part of the Department of Psychiatry and the F. Edward Hébert School of Medicine (America's Medical School) of the Uniformed

Services University (USU). As many of you know, established in 1987, the Center has been proudly fulfilling our mission to mitigate the impact of trauma from exposure to war, disasters, terrorism, community violence, and public health threats. The Center is fully engaged in activities that support the Strategic Framework and mission of USU, as well as the Military Health System, and the broader mission of the Department of Defense (DoD). Through our broad range of activities, we sustain national readiness, enhance national security, and serve an essential role for the DoD and the nation.

The Center's mission is accomplished through leadership, research, training, education, service, outreach, collaboration, consultation, and global health engagement. CSTS continues to have an outstanding multi-disciplinary and collaborative team of scientists, educators, clinicians, and leaders to carry out these activities and advance our mission and goals and to enhance national preparedness.

Focused on health issues of special interest to the military and the nation, the Center's attention is presently targeted to the Coronavirus Disease 2019 (COVID-19) pandemic as well as our ongoing work on post-traumatic stress disorder (PTSD), traumatic brain injury (TBI), suicide and suicide-related behavior, and disaster response and preparedness. CSTS helps inform our nation's policies and responses to the impacts of exposure to trauma from natural and human-made disasters and, especially at this time, the health emergency response to the pandemic.

The Center's work starts in our laboratories and extends to our communities, nation, and across the

globe. We bridge science from the gene, to the person, to the world. We translate knowledge to action by providing rapid consultation, education, and knowledge support to personnel who respond to the health needs of Service members and their families, and personnel who respond to disasters, public health threats, and other crises around the globe. CSTS is uniquely situated to bridge the two fields of military psychiatry and disaster psychiatry.

The Center uses groundbreaking approaches to neuroscience, and conducts innovative research on relevant and timely topics such as suicidal behavior in the Army, and the impact of death and bereavement on military family members. One example of an innovative approach is our involvement in "big data" and precision medicine. Our advanced analytic activities involve using innovative techniques such as machine learning, complex algorithms, and predictive analytics. We use data mining techniques and state-of-the-art statistical methods to analyze previously untapped data sources independently and jointly with other data to gain new insights, resulting in better and faster decision-making, and improving health.

In this Annual Report, you can read summaries of our contributions to enhance psychological health and resiliency, and mitigate and prevent the negative consequences of trauma on individuals, families, communities, and the nation. Our goal is to improve trauma-related care by preparing treatment providers to address the impact of trauma and its far-reaching effects, thereby building a more trauma-informed environment across the continuum of our military and civilian health care systems.

As we create this annual report, in early 2020, CSTS is integrally involved with the DoD's initial and continuing COVID-19 pandemic response through consultation, education, research and collaboration with federal, state, and local governments and leaders on the psychological and traumatic effects of the pandemic. CSTS is providing just-in-time educational resources and surveillance assessments for DoD and our nation's health care. We have engaged with our partner and stakeholder organizations to collaborate

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and provide resources and assistance in responding to COVID-19. In addition, Center personnel have activated their professional contacts and networks and disseminated resources, as well as provided consultation when needed. I encourage our readers to visit the Center's website (www.cstsonline.org) for the latest in our COVID-19 response. Most of this work will appear in next year's Annual Report, but it is going on now and will continue throughout this and next year.

On behalf of everyone at CSTS, I would like to extend our appreciation to all our colleagues and friends who have collaborated with us and assisted us throughout this past year to help us support the Military Health System, the DoD, and our nation.

Robert J. Ursano, MD
Professor of Psychiatry and Neuroscience
Department of Psychiatry
Director, Center for the Study of Traumatic Stress
Uniformed Services University

Our Mission

As an integral part of USU, CSTS's activities support the USU Strategic Framework and the mission of the DoD. CSTS is committed to advancing trauma-informed care. We are dedicated to furthering the nation's understanding of the impact of trauma on individuals, families, and communities. The Center is part of our nation's federal medical school (America's Medical School) at USU, and the Center's mission is aligned with the needs of the DoD and the nation, and is well-positioned to rapidly respond to DoD mission-relevant activities.

The Center's work includes a broad range of trauma exposures: combat, terrorism, natural and

human-made disasters, public health threats, and humanitarian operations. CSTS has been involved in nearly every major disaster our nation has experienced in the past 30 years. The Center helps to ensure that behavioral health is addressed in the face of public health threats, disaster planning, and disaster recovery.

Mitigating the effects of disaster and trauma in military and civilian populations is part of the effort to foster community and national resilience. The Center informs and educates community, regional, state, national, and global stakeholders in government, industry, healthcare, public health, and academia. CSTS contributes to advancing trauma-informed care by providing

leadership in research, education, training, consultation, global health, and



Research

CSTS is involved in a broad range of research, including epidemiological, clinical, and laboratory research. The research is designed to support the Military Health System (MHS) in its efforts to maintain a medically-ready military force for both peacetime and wartime, and to deliver integrated, affordable, effective, and high quality health services. CSTS research encompasses investigations ranging from the causes of suicide in Service members, to the psychological responses to trauma and disasters, to clinical investigations of the symptomatology and treatment of PTSD. The ultimate goals of all CSTS research activities are to improve military readiness and the quality of military care.

RESEARCH ON SERVICE MEMBERS

Study to Assess Risk and Resilience in Servicemembers — Longitudinal Study (STARRS-LS)

Formerly the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)

STARRS-LS is the continuation of a research project that began more than ten years ago to

STARRS-LS

Study to Assess Risk and Resilience in Servicemembers - Longitudinal Study

address the increasing and persistent problem of suicide among Army personnel. The original research project, Army STARRS, was conducted from 2009 to 2015. STARRS-LS began in 2015 and will proceed through 2020 when a STARRS-LS continuation award will begin for at least an additional five years, through 2025. The Army STARRS and STARRS-LS projects were both designed and conducted under the scientific direction and project management oversight of CSTS through a collaborative effort involving USU, the University of California, San Diego (UCSD), Harvard University, and the University of Michigan.

Army STARRS, funded by the Army, included a series of several distinct but integrated studies designed to comprehensively examine the mental health and resilience of active duty Soldiers, including Regular Army, Army National Guard, and activated Army Reserve. The project involved large representative samples of Soldiers, making it the largest research effort of mental health risk and resilience ever conducted among military personnel. The largest of the studies was an historical cohort study of all Soldiers (more than 1.6 million) on active duty in 2004-2009. Army STARRS also included cross-sectional studies, a longitudinal study, and two case-control studies that involved collecting data directly from a combined total of more than 100,000 active duty Soldiers throughout the U.S. and overseas. The studies included administering questionnaires and neurocognitive tests, collecting blood samples, and performing state-of-the-art data analyses and biomarker assays. The project produced large, rich, and representative datasets to serve the goals of Army STARRS.

The Center is currently expanding and enhancing the Army STARRS research through a five-year DoD-funded project called STARRS-LS. Under STARRS-LS, CSTS is continuing to use the STARRS platforms, systems, and data to conduct further analyses and to extend the data by obtaining an additional seven years of Army/DoD administrative data (2010-2016) for the 2004-2009 historical cohort established under Army STARRS. Under STARRS-LS, the research team is also following up on a cohort of more than 72,000 Soldiers who participated in one of the three largest Army STARRS survey studies and who provided consent for researchers to link their Army/DoD data to their STARRS survey data. In addition, a subsample of this cohort was selected by the research team, based on previously identified risk factors and Soldier subgroups of interest to the Army/DoD. The research team re-contacted members of the subsample and administered two waves of follow-up surveys for a more in-depth longitudi-

nal study. Approximately 15,000 Soldiers participated in this phase of STARRS-LS.

Throughout 2019, the research team continued working closely with the Office of the Deputy Under Secretary of the Army (ODUSA) and the Army Analytics Group (AAG) to obtain and process additional Army/DoD administrative records for the historical cohort. Once this database is complete, it will allow for analyses of data from more than 3 million active duty Soldiers over a 13-year period (2004-2016). The research team also completed the two waves of follow-up survey data collection for the STARRS-LS subsample. This longitudinal study is extending the time-frame of Army STARRS to collect and analyze further outcome information from participants throughout their Army careers, and from those who transition out of the Army, through their adjustment to civilian life.

In 2019, the research team conducted many briefings of the research progress and findings. These included in-person briefings to the STARRS Government Steering Committee, meeting with the STARRS Scientific Advisory Board, and in-person briefings at the Pentagon to senior DoD and Army leadership, including the Assistant Secretary of Defense for Health Affairs, the Deputy Under Secretary of the Army, the Army Surgeon General, the G-1, and many other senior DoD and Army leaders. In addition, the research team presented findings at many military and civilian scientific meetings and conferences.

STARRS-LS continued the partnership established with the Collaborative Health Initiative Research Project (CHIRP) to perform whole genome sequencing on DNA from tens of thousands of STARRS participants. CHIRP is a precision medicine-based initiative being conducted at USU in collaboration with the National Institutes of Health (NIH) and the DoD.

Due to the abundance of actionable findings produced by the STARRS research, the Army established a workgroup called the STARRS Research Advisory Team (SRAT). The SRAT is comprised of Army and DoD personnel tasked to review STARRS findings and recommend actions that the



Army and/or DoD can take based on those findings. The STARRS PIs met on a regular basis with the SRAT throughout 2019 to discuss how to best translate STARRS research findings into actions.

The STARRS research team continued to be highly productive at analyzing vast amounts of data, writing-up the results, and submitting manuscripts to scientific journals for publication. At the end of 2019, the team had written and submitted 100 papers for publication in peer-reviewed scientific journals. Of those, 92 papers have been published, one paper was accepted for publication but not yet published (in press), and seven papers were awaiting a decision by the journals. Many additional papers were drafted and were in various stages of progress. The extraordinary, ground-breaking, and complex research conducted by the STARRS research team has continued to benefit the Army, the DoD, and the nation. STARRS data (survey, neurocognitive, and genetic) have been shared with the public to the extent allowed by the Army and by federal regulations for the protection of human research subjects. The public data sets have allowed other researchers outside the STARRS team to analyze the data and produce additional benefits.

Psychological Stress and Resilience in Mortuary Affairs (MA) Soldiers: Longitudinal Study

U.S. Army mortuary affairs (MA) Soldiers recover, identify, and evacuate the remains of the deceased from the theater of war. They are a unique

population of Soldiers who are exposed to combat death and deployment-related stress, and work in a combat environment. This longitudinal research examines the individual, unit, and family stressors, risk factors, and resiliency of MA Soldiers who deploy to the Middle East. Questionnaires are group-administered to MA detachments approximately one week before and after deployment. Empirical and descriptive data are collected on factors such as PTSD, depression, distress (e.g., anger, hostility, somatization), substance use, and instrumental and emotional support. Soldiers also have the option to donate saliva samples, which will be analyzed for potential DNA- and RNA-related biomarkers of stress and resiliency.

In 2019, Reserve MA Soldiers from the 962nd Quartermaster Mortuary Affairs Company (QM CO MA) (from locations in the Pacific Rim), 311th QM CO MA (from Puerto Rico), and 1019th QM CO MA (from New York) participated in the study. The CSTS data collection team met with MA Soldiers at Fort Hood, TX while they were there for mobilization/demobilization activities prior to and after deployment. In total, 241 questionnaires were collected and most Soldiers (71%) donated saliva samples for genetic analysis (171 DNA and 172 RNA saliva samples were collected). Since the study began



in 2005, the CSTS data collection team has met with MA Soldiers 68 times and collected more than 3,300 questionnaires. Data analyses in 2019 included an examination of the relationship between items assessing sensitivity to blood, injury, and mutilation and post-traumatic stress symptoms. Findings from this study will target resiliency, preparation, training, and education of Soldiers for the stressors of deployment and work with the deceased.

Additionally, two CSTS Scientists participated in a multi-service workgroup meeting at the Joint Mortuary Affairs Center (JMAC) in Fort Lee, VA. Attendees included personnel from the Army, Air Force, Navy, Marines, Armed Forces Medical Examiner, Army Chaplain Center and School, and JMAC. The purpose of the meeting was to conduct a thorough review of the material for an upcoming publication, titled *“Multi-Service Tactics, Techniques, and Procedures for Mortuary Affairs in Theaters of Operations MTTP 4-46.”* CSTS contributed an invited section, titled *“Stress, Resiliency, and Behavioral Health Support in Mortuary Affairs Operations.”*

Troop Education for Army Morale (TEAM)

TEAM is a novel stress management and resilience building early intervention program designed to improve post-deployment re-adjustment in U.S. Army MA Soldiers — a group at high risk for psychological problems. The intervention is based on the five evidence-informed principles of Psychological First Aid (safety, calming, connectedness, self-efficacy, and hope/optimism) and delivered through four group workshops, informational handouts, a dedicated website, and phone and email support services. A total of 125 MA Soldiers participated in the study. Baseline questionnaires indicated that MA Soldiers had a high number of traumatic exposures and rates of PTSD and depression similar to combat troops. The intervention did not specifically reduce rates of PTSD. However, the TEAM intervention was well-accepted by the Soldiers and the majority of Soldiers (89%) reported that TEAM was helpful for them. Calming (relaxation training) and problem solving were two of the skills reported to be most helpful. Findings from TEAM has informed future

interventions with military and civilian populations that handle the remains of the dead.

Ecological Momentary Assessment of Post-traumatic Stress Symptoms in U.S. Military Service Members (Daily Diary Study)

The Daily Diary Study uses a novel ecological momentary assessment methodology to assess in real time the post-traumatic stress symptoms of U.S. Service members. The study is designed to examine the relationship between variability in post-traumatic stress symptoms and psychiatric disorders, sleep, health risk behaviors (e.g., alcohol and tobacco use), pain, and other areas of health and functioning. Participants complete daily assessments of post-traumatic stress symptoms four times daily for 15 consecutive days on electronic tablets, using a sophisticated software application developed in collaboration with DHA Connected Health, formerly known as the National Center for Telehealth and Technology (T2) specifically for use in this study. Psychiatric disorders (e.g., PTSD, depression) are assessed at baseline and in one and three month follow-up assessments. Participants have the option to donate saliva and/or blood samples for genetic

analysis to identify potential genetic biomarkers and gene-environment interactions that may distinguish and/or mediate traumatic stress responses and resilience to stress-related disorders. Participants also have the option to wear a wrist actigraph during the 15-day daily diary assessment period. The actigraph provides an objective measure of sleep that will complement participants' self-reports of sleep. In 2019, 33 Service members enrolled in the study. Collectively, they provided 1,456 daily post-traumatic stress symptom assessments, 57 saliva and 58 blood samples for genetic analysis, and 30 participants wore an actigraph to assess sleep. Data analyses in 2019 included an examination of the relationship between sleep disturbances (i.e., short sleep duration, poor sleep quality, trouble falling asleep, and difficulty staying asleep) and variation in post-traumatic stress symptoms the following day. The findings were published in the peer-reviewed journal, *BMC Psychiatry*. In addition, study findings have been presented in poster sessions at local, national, and international scientific conferences. The Daily Diary Study represents the cutting-edge in psychological assessment methodology, measures, equipment, technology, and research designed to better understand and improve the well-being of Service members.



Reserve Components of the U.S. Armed Forces

The Citizen Soldiers of the Reserve Components (RC) of the U. S. Armed Forces play an important role in national defense. Compared to the Active Component (AC), the RC personnel experience unique stressors when the nation is at war and when the RC is called upon for emergency service, such as disaster relief. CSTS is strongly committed to supporting the RC through a broad range of activities. The Child and Family Program studied RC members and their families to address the needs of children and families affected by trauma. In addition to research, CSTS also provided consultation to RC units. Through this consultation, the RC leadership was provided with information products specifically geared to their needs.

In collaboration with Dr. Sandro Galea at Boston University, CSTS continued the nationwide longi-

tudinal research study on the RC personnel. Using a representative national cohort of 2,003 National Guard and Reserve Service members, this study specifically addresses the epidemiology and trajectory of mental health problems, deployment stress, health risk behaviors, and health care utilization. CSTS is actively analyzing this comprehensive dataset to address the health and resilience factors and experiences of the RC personnel. Recently, the association of separating from military service with risk of mental health problems at three time points was examined. Compared to RC Soldiers who stayed in the military, those who left the military had higher risks of mental health diagnoses, including major depressive disorder (MDD), suicidal ideation at one year after leaving military service, and a higher risk of mental health diagnosis at 1.6 years after leaving military service. These results provide important information on the risk pattern of mental health problems, and in particular, of increased suicide risk by length of time since leaving the military among the RC personnel in the United States.

The Army STARRS project and the follow-on STARRS-Longitudinal Study have also provided a wealth of data about RC Soldiers. The team continues to study the long-term health of RC Soldiers, using administrative data sets as well as data collected as part of STARRS research. Future STARRS-LS surveys will continue to study RC Soldiers as a population of special interest.

PTSD and Sleep Study

Sleep disturbances and PTSD are prevalent and often co-occur among Service members with combat experience. There is wide variability in the response to treatments for sleep disturbances, and little is known about how various factors, including co-occurring PTSD, combine to predict treatment response, hampering efforts to select effective treatments for individuals. The CSTS is leading an effort to identify factors that predict variation in sleep disorder treatment response, with the goal of developing predictive analytic models. The effort, in collaboration with Harvard Medical School, will utilize data from the Army STARRS, as well as data



from the Sleep Disorders Center at the Walter Reed National Military Medical Center (WRNMMC). Heterogeneity of treatment effects analyses will be used to identify predictors of variation in sleep disturbance treatment response. This work will form the basis for future efforts to develop clinical tools for practitioners, which will improve treatment selection for individuals with PTSD-related and other sleep disturbances.

RESEARCH IN THE CHILD AND FAMILY PROGRAM


The Child and Family Program (CFP) conducts research to better understand the needs of children and families affected by traumatic events, with special emphasis on the needs of military families. CFP informs scientists, clinicians, and the general public about the impact of stress and trauma on children and families through scientific publications, national and international presentations, and hardcopy/web-based resources. Military children and families possess unique strengths, but can also be affected by combat-related illness and injury, bereavement, child maltreatment, and family violence that result in vulnerabilities. CFP's pioneering research addressing these complex issues has been translated into scholarly publications, as well as actionable and educational materials for military and government stakeholders, clinicians, and community leaders.

CFP also consults with military and government leadership, informs national media outlets, and conducts projects that promote understanding of children in the U.S., and more broadly throughout the world.

Bereavement

The National Military Family Bereavement Study (NMFBS)

The NMFBS was the first large, systematic study examining the impact of a U.S. military Service member's death on their surviving family members.

The logo for the Stepping Forward in Grief (SFG) Study is circular. It features a central image of several smooth, light-colored stones stacked on top of each other, forming a staircase. The text "Stepping Forward in Grief" is written in a blue, sans-serif font along the top inner edge of the circle. The text "Uniformed Services University • Columbia University" is written in a red, sans-serif font along the bottom inner edge of the circle. Two small blue stars are positioned on the left and right sides of the circle, separating the top and bottom text.

The goal of the study was to build upon the civilian research literature on bereavement and its impact on survivors, and determine how psychological, physical, and/or behavioral outcomes of the grieving process are influenced by family members' pre-existing psychological and physical health, social and grief support, and military-specific factors. Approximately 850 adults and 120 children completed the study, and 981 participants provided saliva samples for analysis of genetic biomarkers associated with bereavement-related outcomes. Data from the NMFBS will be used to examine coping strategies in order to identify actionable targets for intervention programs. As part of this groundbreaking work, CSTS partnered with colleagues at Columbia University, New York University, University of Pittsburgh, and UCSD to develop criteria for a persistent grief disorder to be included in future editions of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM). In 2019, CSTS published a manuscript in *Psychological Medicine* and CSTS Scientists gave several presentations regarding findings from NMFBS at national conferences.

Stepping Forward in Grief (SFG) Study

The NMFBS found that a sizable proportion of surviving military family members suffer from high levels of grief and distress, putting them at risk for mental and physical health difficulties. As a re-

sult, CFP formed a partnership with the Center for Complicated Grief at Columbia University to adapt principles from Complicated Grief Therapy (CGT), shown to be helpful in civilian populations, for a digital intervention to assist with grief integration and decrease risk for long-term problems. This randomized controlled trial compared the effectiveness of two digital programs (GriefSteps and WellnessSteps) in helping those bereaved by military service-related death in managing and adapting to grief. During 2019, 556 participants completed baseline and two follow-up assessments. CSTS scientists are currently conducting analyses to determine the impact of GriefSteps and WellnessSteps on grief adaptation.

Study of Long-Term Outcomes of Terrorism-Related Grief

CFP partnered with Voices of September 11th (VOICES), a nonprofit organization that aids 9/11-affected families, and the Canadian Resource Centre for Victims of Crime (CRC), an organization supporting family members who were bereaved by the Air India Flight 182 bombing, to investigate long-term bereavement outcomes in family members following terrorism-related death. More than 400 bereaved family members participated in the study. In 2019, CSTS published a manuscript in the *Journal of Traumatic Stress* that identified patterns of depression, anxiety, and grief in bereaved family members. A second CSTS paper that is currently under peer review described the effect of being notified multiple times of human remains on grief and posttraumatic stress.

Child Maltreatment in U.S. Military Communities and Families

CFP examines risk factors for child maltreatment in military families to inform prevention and intervention. Initial work investigated 400 substantiated child neglect cases from four high operational tempo Army installations. CFP has published manuscripts on risk factors for child neglect in *Military Medicine* and *Child Maltreatment*. Under a study funded by DoD, CFP examines risk and protective factors for child maltreatment in military

families from all Service branches. Phase I involved a case-control comparison study of military families with dependent children in FY 2014 to identify the family, Service member, and military characteristics associated with heightened and diminished risk of substantiated child maltreatment incidents. Phase II builds on these findings to develop a life course model of military family child maltreatment. Using data from active duty Service member families with one or more dependent children in FY 2009 through FY 2018, CFP will conduct survival analyses to investigate predictors of substantiated child maltreatment. Results from this congressionally-mandated research will inform DoD's policy and practice approaches related to child maltreatment prevention and respond to House Report 114-577, which calls for studies to examine and understand the causes of the increase in child abuse and neglect in military families.

Combat Injured Families

CFP scientists conducted three studies over the past few years to examine the impact of combat injury on military families, to better understand and address the needs of these families. The first study involved interviews with military families to assess challenges related to combat injury and associated family functioning at Operation Purple Healing Adventures (OPHA), sponsored by the National Military Family Association (NMFA). CFP continues to perform data analysis on this study. The second study investigated the impact of combat injury on military families over time at WRNMMC and San Antonio Military Medical Center, to inform intervention strategies for spouses and children of combat injured Service members. The final study, Families OverComing Under Stress-Combat Injury (FOCUS-CI), consisted of a pilot for a novel intervention for children and families of combat injured Service members using a randomized controlled trial approach to assist families coping with severe combat injuries. Data CFP collected from this project have provided insight into issues of intimacy within marital relationships between combat injured Service members and their spouses,



suggesting that intimacy is negatively impacted by spousal post-traumatic stress related to the Service member's combat injury. Findings will inform interventions that more effectively address the needs of these families.

Family Violence

The purpose of the CSTS Family Violence and Trauma Project is to help raise the scientific knowledge of family advocacy, medical, and social service providers affiliated with the Army Family Advocacy Program (FAP). Core products to help achieve this purpose include two newsletters—*Research Review* (RR) and *Joining Forces, Joining Families* (JFJF)—which provide workforce education on family violence-related prevention and intervention research.

Highlights of CSTS knowledge products for 2019 included:

- Two JFJF newsletters featuring in-depth coverage of child exposure to intimate partner violence and evidence-based screening for abusive head trauma.
- Two RR newsletters briefly summarizing a broad range of current family violence research.
- Army family violence fatality review board report.
- Development of an installation-level PowerPoint

briefing template to help installation FAP managers present report findings in ways that helps installation leaders visualize longitudinal family violence trends.

- Two book chapters (Paternal Filicide and Child Maltreatment in Military Communities) that will be published in *SAGE Handbook of Domestic Violence* in 2020.

RESEARCH IN NEUROSCIENCE AND NEUROBIOLOGY

Laboratory Research in Neuroscience and Neurobiology

Genetics and Biomarkers

CSTS laboratory research continued to search for potential biomarkers for PTSD. Since the Iraq and Afghanistan wars, the rate of PTSD has significantly increased in the combat veteran population. Cytokines, including chemokines, interferons (INF), interleukins (IL), and tumor necrosis factors (TNF), have been associated with PTSD. However, few cytokine biomarkers for PTSD have been identified. Cytokines, including chemokines, are small secreted proteins which specifically affect the interactions and communications between cells. Pro-inflammatory cytokines are produced predominantly

by activated macrophages and are involved in the upregulation of inflammatory reactions. CSTS used both before-and-after and case-control studies to search for potential chemokine biomarkers associated with PTSD onset, risk, and resilience, as well as stress responses in U.S. Service members deployed to Iraq and Afghanistan. CSTS obtained blood samples and scores on the PTSD Checklist (PCL) from Soldiers pre- and post-deployment (pre, post). Forty chemokines were measured by CSTS scientists using the Bio-Plex Pro Human Chemokine Panel Assays. The before-and-after analysis showed potential markers (CCL2, CCL15, CCL22, CCL25, CXCL2, and CXCL12) are associated with PTSD onset, and CCL3, CXCL11, and CXCL16 are related to stress response. The case-control study demonstrated that CCL13, CCL20, and CXCL6 were possible PTSD risk markers, and CX3CL1 might be a resilience marker. In addition, CCL11, CCL13, CCL20, and CCL25 were correlated with PTSD symptom severity. CSTS data, for the first time, suggest that these dysregulated chemokines may serve as biomarkers for PTSD onset, risk, and resilience as well as stress responses, and may prove beneficial in developing approaches for PTSD diagnosis and treatment. CSTS findings were published in *Translational Psychiatry*.

Drug Development for the Treatment of PTSD

The Center, in collaboration with the University of California, Irvine (UCI), established a multi-species methodology for evaluating potential new compounds to treat PTSD. This effort uses a non-mammalian model (zebrafish) for high-throughput screening in conjunction with a long-established rodent model. The zebrafish colony will provide an abundance of potential research opportunities in drug development and beyond. The zebrafish lab recently began testing large chemical libraries to both create standard drug profiles within the zebrafish system, and to find promising candidates for drug repurposing. In addition to high throughput embryo testing, the CSTS lab has begun ramping up efforts to perform testing in adult zebrafish which have more than 100 testable characterized behaviors. Once fully established, the lab will begin





CSTS staff conducting laboratory experiments.

high throughput testing of novel compounds and coordinate with its collaborators regarding future directions for screening. Currently, several novel compounds are pending testing, and successful compounds will be evaluated in the established rodent model at UCI.

Chronobiology, Light, and Sleep Research

The overarching goal of the Chronobiology, Light, and Sleep lab research program is to further understand sleep, circadian rhythms, and light in order to maximize human health and well-being. To that end, CSTS takes two major research approaches. From a basic science perspective, the Center focuses on the neural mechanisms underlying the modulation of photic sensitivity for the biological effects of light in both humans and animal model systems. From a clinical/translational perspective, CSTS examines how the basic science of this primitive sensory system can guide the rational development of clinical therapies and architectural lighting strategies. One key aspect of a successful transition

to application includes a carefully developed, tailored, and tested educational component, which has become an emerging priority for this group. Since methods for examining circadian rhythms in humans under more naturalistic conditions are quite limited and controlled laboratory studies are impractical for many populations of interest, parallel work includes the validation of novel strategies for assessing sleep and circadian health in the home environment.

Current ongoing CSTS studies include both laboratory and applied work. For the former, CSTS is conducting rigorous characterizations of the biological effects of light, including examination of the effects of light exposure parameters such as spectrum, intensity, directionality, and photic history on phase shifting, acute alerting, mood, pupillary response, and light-induced suppression of melatonin. In the field, CSTS scientists assess sleep and circadian health in students, hospital night shift workers, active duty Service members, and clinical populations. In parallel, CSTS has developed and begun testing sleep and circadian educational programs that are tailored to specific populations of interest, in order to provide the target populations with evidence-based information and optimize uptake of novel interventions. In combining this work, the Center aims to create comprehensive, multi-component interventions that ultimately serve to enhance the health and performance of those most in need.

Clinical Research in Neuroscience and Neurobiology

Riluzole Augmentation Treatment for Complicated Combat-Related PTSD

CSTS completed recruitment of a multi-site clinical trial at WRNMMC and the Syracuse Veterans Affairs Medical Center. This study, funded by the U.S. Army Military and Operational Medical Readiness Program, enrolled participants between 2014 and 2017, testing the efficacy of riluzole for treatment of combat-related PTSD in veterans who did not fully respond to standard medication treatment for PTSD. Riluzole alters activity of glutamate, the primary excitatory neurotransmitter in the

brain. Preclinical research suggests that riluzole may protect neurons from damage due to an excess of glutamate in affected brain regions. This trial compared the addition of riluzole to placebo in a randomized, double-blind trial over eight weeks. The primary outcome was improvement in PTSD symptoms as measured by the Clinician-Administered PTSD Scale (CAPS). In addition to psychometric data, investigators collected magnetic resonance spectroscopy concentrations in the amygdala and anterior cingulate cortex before and after treatment as a potential biomarker of illness and treatment response. Analysis to date suggests that riluzole offers superior efficacy to placebo in the treatment of hyperarousal symptoms of PTSD (manuscript submitted for publication), but does not show superior efficacy in overall PTSD symptoms. Riluzole did not demonstrate significant adverse side effects. Further analysis will determine if spectroscopy changes in the amygdala, anterior cingulate cortex, and hippocampus correlate with improvement due to riluzole treatment. Imaging data are still under analysis.

Enhancing Fear Extinction via Angiotensin Type 1 Receptor Inhibition: A Randomized Controlled Trial in Post-traumatic Stress Disorder

CSTS continued its collaboration with the UCSD as part of a multisite clinical trial testing the efficacy of the blood pressure medication losartan for treatment of PTSD. Losartan is an angiotensin receptor blocker, currently FDA-approved for treatment of high blood pressure. Leveraging preclinical evidence of the role of the renin-angiotensin system in the central nervous system in fear memory reconsolidation, angiotensin receptor blockers like losartan appear to enhance fear extinction. This trial compares treatment with losartan to placebo as mono-therapy for treatment of PTSD over 10 weeks of treatment. The primary outcome of this study will be improvement in PTSD symptoms as measured by the CAPS at the beginning and end of treatment. This study will also examine the influence of a specific angiotensin converting enzyme (ACE) gene as a potential biomarker of treatment response. CSTS recently

completed recruitment of participants at WRNMMC for this multi-site study. Other study sites included Massachusetts General Hospital, McLean Hospital, and New York University.

Nightmare Deconstruction and Reprocessing (NDR) for Treatment of PTSD-related Nightmares

Nightmares and insomnia are signature symptoms of PTSD and among the most resistant to evidence-based treatment. CSTS is conducting a clinical pilot trial of Nightmare Deconstruction and Reprocessing (NDR), an exposure-based psychotherapy for PTSD-related nightmares and insomnia. NDR is an adaptation of the Hill cognitive-experiential model for working with dreams in psychotherapy. It specifically targets participants' most distressing nightmare images and their understanding of their distress related to these images in order to facilitate reconsolidation of trauma-related memories. In working toward the goal of conducting a full-scale clinical trial of NDR, CSTS is partnering with WRNMMC, Naval Medical Hospital San Diego, and the NIH to test a range of potential psychometric, physiologic, and biochemical markers of NDR's tolerability and feasibility as a treatment in military Service members and veterans. In addition to assessing nightmare and insomnia severity, suicidality, and PTSD symptoms, the study is performing assays of genetic and inflammatory biomarkers at various points in treatment as potential indicators of treatment response, as well as continuously monitoring physiologic indicators of stress, such as heart rate variability and skin conductance. The study began enrolling participants in December 2019 and is ongoing.

The VA National PTSD Brain Bank

The VA National PTSD Brain Bank is a human tissue repository that collects, processes, stores, and distributes research specimens for future scientific studies. It is the first brain tissue repository dedicated to examining the impact of trauma and stress on brain tissue and function, with the objectives of identifying biomarkers of susceptibility and resilience to trauma, and assisting in targeting new treatments at the cellular level.



The Brain Bank enrolls potential donors across the nation. Donors receive comprehensive longitudinal assessment via clinical interview and periodic surveillance from the time of enrollment until the time of their death, when their brain tissue is donated to the Brain Bank. The Brain Bank has also developed a protocol for comprehensive post-mortem diagnostic assessment of donors (through medical record review and third-party interview) for instances in which ante-mortem assessment of PTSD is not possible. The Brain Bank began collecting tissue in 2015 and has now obtained tissue from 267 donors, 101 of whom received a primary diagnosis of PTSD. In addition, 114 living persons have enrolled in the longitudinal follow-up registry to serve as future donors.

CSTS Scientists direct the Brain Bank's Assessment Core and serve on the Brain Bank's Scientific Advisory Board. The Assessment Core developed a new standardized record review form ensuring that all collection sites render post-mortem diagnosis of PTSD (and comorbid conditions) in a harmonized manner. The form will also facilitate export of relevant diagnostic data in conjunction with ongoing genomic analyses. Through CSTS, the Brain Bank has also collaborated with the Lieber Institute for Brain Development and the USU Collaborative Health Initiative Research Program (CHIRP) to perform whole genome sequencing and methylation studies in collaboration with Yale University, for the Brain Bank's first core study.

In 2019, CSTS Scientists continued their work with the Armed Forces Retirement Home (AFRH) in Washington, DC to allow researchers to regularly

inform AFRH residents of opportunities to participate in PTSD research, including the Brain Bank project. Recruitment and assessment procedures for the Brain Bank's AFRH enrollment site were finalized in 2019 and full research engagement is expected to commence in 2020.

RESEARCH ON DISASTERS AND TERRORISM

Florida Department of Health Response to Multiple Hurricanes

CSTS Scientists continued to identify risk factors for adverse responses following natural disasters in civilian and military populations, including post-traumatic disorders, psychological distress, and health risk behaviors. Further, during the past year, the Center has specifically focused on protective factors that can help to promote resilience following exposure, including collective efficacy and hurricane preparedness behaviors. This work is particularly important in light of the multiple disasters that have occurred within the past year, including the devastating California wildfires and Australian bushfires, Hurricane Dorian, and extreme weather events. These include typhoons, heatwaves, and droughts, which resulted in significant destruction to property, as well as severe injury and death to community residents. During 2019, Center Scientists identified factors that may play a role in recovery from multiple hurricane exposure by examining the behavioral



responses in Florida Department of Health workers who were both first responders to, and were personally affected by, a series of hurricanes that occurred in 2004 and 2005. In particular, CSTS examined the influence of individual perceived collective efficacy prior to the 2005 hurricanes on community residents' self-reports of hurricane preparedness. Findings indicated that higher perceived collective efficacy was associated with greater hurricane preparedness nine months after the hurricanes, even after adjusting for individual and community socio-demographic characteristics, individual injury/damage, community storm damage, and hurricane preparedness prior to the hurricanes. This research suggests the importance of neighborhood cohesion in promoting resilience, and the usefulness of developing strategies that increase community collective efficacy. This can be accomplished through community-level interventions, which are cost-effective, practical, and may reach individuals who may not seek or have available interventions after a disaster.

Washington, DC Area Sniper Study

Recognizing the increased incidence of terrorist attacks worldwide, the Center continued to focus on the psychological and behavioral impact associated with these traumatic events. The aim of this research is to identify mechanisms that may affect responses, and through these findings, develop actionable recommendations for health care providers and community leadership. This research makes a unique contribution to the understanding of terrorist events and their sequelae by examining data collected from 1,238 community residents during the 2002 Washington, DC area sniper attacks. Recent work has examined the role of confidence in local law enforcement and government, and perceived safety on changes in behavior related to routine activities during the sniper attacks. Findings indicated that those who were younger, female, and reported lower levels of confidence in local law enforcement/government, and lower perceived safety, were more likely to change their routine behaviors in response

to the sniper attacks. A better understanding of the interrelationships of cognitive and behavioral mechanisms have implications for targeted recommendations to help reduce psychological distress and functional impairment in community residents exposed to terrorist events.

Washington Navy Yard Shooting Study

The Center completed data collection at the Washington Navy Yard as part of multi-site study in collaboration with the University of California, Los Angeles (UCLA) and funded by the National Institute of Justice, which was designed to better understand risk and protective factors associated with response efforts following community mass violence. The first phase of the study involved performing assessments at the sites of five school mass shootings. The second phase focused on six community violence events, including the Washington Navy Yard workplace mass shooting in 2013, to examine the impact of this mass shooting incident. This collaboration leveraged a long-standing relationship with Naval Sea Systems Command (NAVSEA) to provide a better understanding of the social and occupational difficulties still impacting personnel following the event. The Center is collaborating with UCLA in the process of data analysis and development of a final report. The results will inform public policy on future interventions following mass violence events.



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Education and Training

An essential element of the Center's work is training and education. Center Scientists provide education and training to USU medical students committed to service in the nation's Public Health Service, Army, Air Force, and Navy. CSTS educates health care providers and community leaders in federal, state, private sector, and global settings. CSTS also sponsors conferences, forums, symposia, and seminars with focused educational and training objectives. CSTS helps advance the field of military and disaster psychiatry through presentations, training, and outreach, and participation in conferences, collaborations, and workshops throughout the U.S. and global community. CSTS also educates and expands knowledge through public health efforts and interventions before, during, and after a broad range of disaster events.

One of the Center's instrumental public health education tools is development and dissemination of educational materials to inform stakeholders, including: healthcare personnel, families, community and organizational leaders, first responders, public health emergency workers, teaching professionals, and policy makers. For more than two decades, CSTS has created customized, easy-to-read, highly actionable, and just-in-time educational fact sheets to assist Center stakeholders in managing the ad-

verse effects of disaster events through enhanced preparedness, response, and recovery efforts.

In 2019, the Center provided educational resources to partners throughout the DoD, other Federal agencies, state and local agencies, professional associations, and international partners. CSTS also responded to many disaster events, including the mass shooting incidents at the Virginia Municipal Center, VA; Gilroy Garlic Festival, CA; Henry Pratt workplace, IL; El Paso, TX and Dayton, OH malls; Pearl Harbor, HI and Pensacola Naval Air Station, FL; coordinated shootings at multiple New Zealand mosques; floods in Ontario, Canada; wildfires in California; and Hurricane Dorian, which impacted the Bahamas, southeastern United States and Atlantic regions of Canada.

DISASTER RESPONSE AND PUBLIC EDUCATION

Since its inception in 1987, the Center has been providing disaster preparedness and response education and consultation in a variety of forms and in many situations. CSTS personnel have provided on-the-ground education and consultation in response to extreme national and global disasters, as well as immediate and long-term online, video, and telephonic support to assist response and recovery efforts following a wide range of disaster events, which have impacted various organizations and communities.

The Center's Assistant Director serves as Chair of the Disaster Committee for the American Psychiatric Association, the world's largest professional organizing body of psychiatrists. Current and former CSTS personnel have been sought out to provide guidance on disaster preparedness, response, and recovery efforts as a result of the experience and subject-matter expertise obtained while working at the Center.

The following are examples of Center disaster response and education activities in 2019:



CSTS staff at conference exhibit booth.

- Center scientists collaborated with Navy Medicine leadership to support their response and recovery efforts following the collisions of the U.S.S. McCain and U.S.S. Fitzgerald, as well as a series of suicides on Naval installations, by helping to refine and implement a data collection instrument to support the well-being of Sailors and enhance understanding of the impact of these events on Sailor and family readiness.
- In response to a catastrophic hurricane in Florida, Georgia, Virginia, and the Carolinas, CSTS developed and disseminated dedicated website education pages to provide actionable guidance for responders and emergency workers, families, healthcare personnel, and community leaders to reduce distress and enhance well-being.
- To support members and leaders in Spanish-speaking communities impacted by hurricanes in the Southeastern United States and wildfires in Canada, the Center translated and disseminated Spanish versions of the disaster education fact sheets to provide actionable guidance on early interventions following mass trauma, supporting the well-being of children following disasters, managing the psychological effects of exposure to human remains, and resources on leadership grief, stress management, and communication.
- The Center provided consultation and collaboration with the Army Public Health Command to develop resources and analyze data in the assessment of a series of suicide clusters on Army installations.
- Center Scientists provided educational support to the USU Masters in Public Health Program by delivering educational seminars on domestic and international disaster behavioral health.
- CSTS partnered with the National Center for Disaster Medicine and Public Health (NCDMPH) to hold a conference titled, “Crisis Leadership Symposium: Promoting Emotional and Mental Well-Being.”
- For the fifth consecutive year, a Center Scientist was invited to provide disaster psychiatry training for the fourth-year psychiatry residents at the University of Maryland/Sheppard Pratt

Psychiatry Residency Program.

- Center Scientists were invited to present at the annual “Hidden Heroes Journey Home” symposium, sponsored by the John P. Mayhugh Foundation. The symposium, attended by members of Congress and congressional staffers, enhances the understanding of government officials regarding the challenges faced by military Service members and others following traumatic events such as war and other disasters.
- The Center continued ongoing collaborations with the NCDMPH by initiating a revision of the 2014 “Curriculum Recommendations for Disaster Behavioral Health Professionals.” This document is the only disaster behavioral health curriculum of its kind, and has been disseminated to numerous countries; a full update is anticipated for release in 2020.

NEUROSCIENCE MODULE FOR PRE-CLERKSHIP USU MEDICAL STUDENTS

The Neuroscience & Behavior Module is a multidisciplinary eight week course. The module teaches medical students the principles of neuroscience through integrated content across a range of disciplines. From this foundation, students learn to recognize, describe, and diagnose common neuroscience-related medical conditions with a focus on effective management of a wide variety of neurologic and psychiatric conditions. Effective, safe, and patient-centered clinical skills, including the performance of neurologic and mental status examinations, were developed through simulated patient experiences. Topics related to military medicine, medical history, and health systems science are integrated throughout the module with the goal of fostering a robust and well-rounded education for future military medical officers.

CSTS GRADUATE STUDENT FELLOWSHIP

The Center’s commitment to advancing research into the neuropsychiatric consequences of trauma and its effects on neural function and overall brain



health includes a Graduate Student Fellowship program to support outstanding USU graduate students in pursuit of their doctoral degrees. The CSTS Graduate Student Fellowship program provides two years of salary and travel support. In 2019, due to the number of outstanding candidates, CSTS awarded two winners from a highly competitive pool of applicants: Ms. Maegan Paxton and Mr. Michael Shaughness. Ms. Paxton is a fourth-year student in the Clinical Psychology program, and is completing her dissertation work with Dr. David Riggs, Professor and Chair of the Department of Medical and Clinical Psychology. Mr. Shaughness is a fourth-year student in the Neuroscience Program working with Dr. Kimberly Byrnes, Associate Professor in the Department of Anatomy, Physiology & Genetics and Director of the USU Graduate Program in Neuroscience. Ms. Paxton was a Research Assistant at CSTS prior to entering the graduate program at USU. CSTS is very proud to see a former employee advancing in her career.

EDUCATION AND TRAINING IN COMBAT AND OPERATIONAL STRESS CONTROL: OPERATION BUSHMASTER

CSTS Scientists offer training in Combat and Operational Stress Control (COSC) as a core component in military medical education. In line with USU's mission to prepare uniformed health professionals to support the readiness of the U.S. Armed Forces, CSTS Scientists engaged in curriculum preparation, faculty development, and direct teaching as part of the annual medical field training exercise, OPERATION BUSHMASTER. This training exercise challenged senior medical and graduate nursing students to operate in forward medical units in a complex battlefield simulation over four days. Students evaluated and treated a continuous stream of battlefield casualties and non-battle injuries, and conducted public health and health outreach activities while on a simulated combat deployment. Evaluation and treatment of combat and operational stress reactions were core skills taught and evaluated as part of the exercise. CSTS faculty collaborate with the psychiatry residency programs of the National

Capital Consortium and the San Antonio Uniformed Services Health Education Consortium to provide an opportunity for resident physicians to develop their teaching skills and understanding of COSC as part of their core military-unique curriculum.

EDUCATIONAL CONFERENCES

The Center sponsored two educational conferences in 2019: the 14th Annual Amygdala, Stress, and PTSD Conference and the Symposium on Reimagining Reintegration.

Amygdala, Stress, and PTSD Conference

In 2019, the Center presented the "14th Annual Amygdala, Stress, and PTSD Conference: Risk, Resilience, and Recovery." This annual international conference was sponsored by CSTS in collaboration with the USU Department of Psychiatry, USU Neuroscience Program, USU Department of Family Medicine, and the WRNMMC Department of Psychiatry. With more than 300 registrants, this conference brought together scientists, clinicians, and policymakers for a day of working towards solving the biological basis of stress, fear, and PTSD. Nationally renowned speakers came from leading institutions across the U.S., including the University of Pittsburgh, the Icahn School of Medicine at Mt. Sinai, the National Institutes of Health, and George Washington University. The speakers presented and discussed topics such as resilience, gene activity related to chronic PTSD symptoms, mobilizing hope in brief clinical encounters, preclinical development of ketamine for depression, and the role of sleep in resilience and readiness.

In addition, a recorded session from the 2019 Amygdala Conference was added by the American Psychiatric Association (APA) as a continuing medical education (CME) course entitled, "*Resilience: The Science of Mastering Life's Greatest Challenges*." This course outlines training methods to increase resilience and the ability to 'bounce back' after trauma. Specific factors were discussed through the experiences of survivors who described real-life methods to develop resilience.

Symposium on Reimagining Reintegration

In 2019, CSTS co-sponsored the symposium “Reimagining Reintegration: The Challenge for Deployed Doctors.” The symposium assembled a group of interdisciplinary experts in healthcare and the humanities to discuss the unique problems of healthcare workers returning from combat deployment. Incorporating perspectives from anthropology, history, psychology, and the performing arts, panelists discussed the complicated issues of returning to life as usual after an extended period of providing casualty care, and considered a range of potential approaches to facilitating healthy reintegration.

TRAINING TO SUPPORT RESEARCH

The Center trains and educates its own staff, including research support staff such as Research Assistants (RAs). RAs play an important role in supporting research at CSTS, and are provided with opportunities to learn by working closely with CSTS Scientists and other staff. The RAs contribute to Center research in many ways, including conducting



Dr. West presenting at the Symposium on Reimagining Reintegration.

literature searches, data collection, data entry and quality control, producing tables and graphic representations of study findings, and writing summary reports of meetings. The RAs acquire valuable research skills at CSTS, including developing slides and posters for research presentations, and presenting research findings to professionals as well as the general public. In addition, RAs are offered professional development opportunities, including attending, presenting posters, and representing CSTS at professional conferences, and assisting with manuscript preparation for publication in peer-reviewed scientific journals. Many RAs move on to further their education by pursuing advanced degrees. Others advance to careers in research and related fields. CSTS RAs have furthered their education at institutions including Yale, Notre Dame, Johns Hopkins, Duke, Columbia, Georgetown, London School of Hygiene and Tropical Medicine, University of Maryland, George Washington University, Catholic University, and USU. Opportunities that RAs have pursued following their experience at CSTS have included:

- Ph.D. programs in psychology and related fields
- Medical school
- Law school
- Master’s degree programs in psychology, counseling, public health, and social work
- Training positions at the NIMH and other institutes at the NIH
- Careers with the FBI

DISSEMINATION AND IMPLEMENTATION OF HEALTH AND RESEARCH KNOWLEDGE

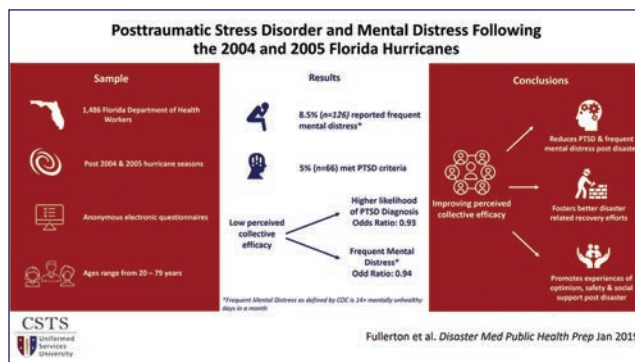
Fact Sheets and Infographics

Fact sheets are a highly regarded and long-standing communication tool of CSTS. They are easy to understand, topic-focused, and actionable education resources developed using expert knowledge to communicate essential behavioral health content on difficult and/or crisis-related issues. Fact sheets and infographics address the needs of a broad range of partners and stakeholders, including health care providers, first responders and emergency workers,

family members, community leaders, and policy makers. CSTS fact sheets, which are developed, updated, and maintained in an online repository, address a wide range of issues pertaining to preparedness and response for disasters, such as mass violence, natural disasters, and pandemics; risk and crisis communication; elements of crisis leadership; family health behaviors; and health risk education. CSTS fact sheets and infographics provide readers with resources tailored to the unique aspects of each disaster event and disaster community. The Center develops and rapidly disseminates fact sheets in real time following major disasters and traumatic events, such as community violence, terrorism and bioterrorism, and public health threats.

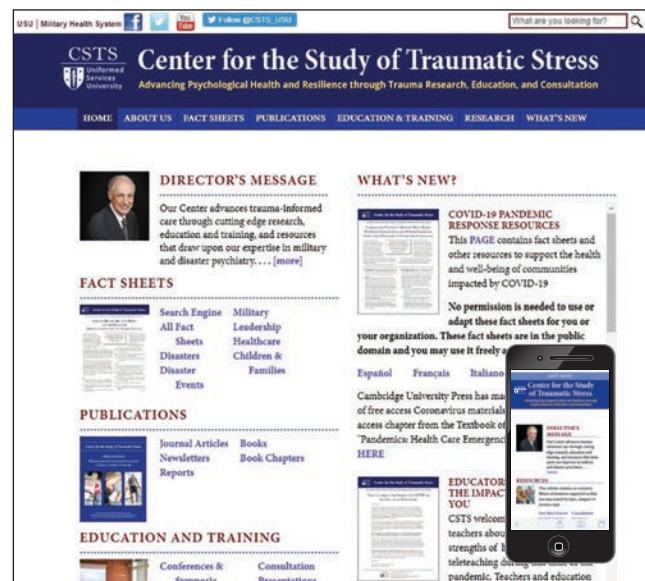
Visual Abstracts

CSTS posts visual abstracts of research publications on the Center’s Facebook and Twitter accounts. Used to enhance the visibility of published research, visual abstracts communicate scientific findings as graphic representations to professional as well as lay audiences. In 2019, CSTS produced visual abstracts for a number of studies including: STARRS, Child and Family, Daily Diary and Florida Hurricane publications.



Website

A primary tool the Center uses to further the goal of disseminating relevant and timely information to a wide range of stakeholders is the CSTS website (www.CSTSonline.org). Throughout the year, CSTS personnel continually added content and made content more accessible. Material available on the website includes summaries of current research activities, publication citations, newsletters, con-



ference reports, and a searchable repository of CSTS disaster mental health education fact sheets. The website includes a “What’s New” section to highlight recent disaster education materials, research initiatives, publications, conference summaries, and announcements of upcoming events. In 2019, the CSTS website was used by an average of 1,785 persons per month for a total of 21,422 users over the calendar year. Mobile users comprised 22% of those who viewed the website. Most of the website visitors in 2019 (83%) were from the U.S., but people from a total of 133 countries visited the website. Aside from the U.S., the countries with the most users were Australia (420), Canada (411), China (269), and the United Kingdom (264).

Social Media

In 2019, the Center continued to grow its online presence through the use of social media. These social media resources allow for the timely dissemination of relevant content to CSTS partners and the public. New in 2019 was the use of visual abstracts to communicate published research findings. CSTS Twitter followers increased by 24% and CSTS Facebook followers increased by 26% in the past year. The Center encourages people to visit and follow CSTS postings via Twitter and Facebook to stay up-to-date on new CSTS activities and publications. “Like” CSTS on Facebook at Center for the Study of Traumatic Stress and follow CSTS on Twitter @CSTS_USU.

Consultation

Consultation has always been and remains a core function of the Center. It is a primary mechanism through which CSTS staff share research findings and apply the deep and broad experience of CSTS staff and leadership. The fact that consultations are sought from CSTS, rather than sought by CSTS, is a testament to the respect that the Center receives from around the world. In addition, consultation is a valuable mechanism to ensure that CSTS staff are aware of, and responsive to, those who face challenges and opportunities related to trauma of many types. The Center has developed partnerships with, and provides consultation to, many agencies and organizations throughout the DoD and other federal agencies, as well as with state, local and national agencies, professional associations, and international organizations. The Center has established many longstanding organizational relationships, and is continuously increasing its consultative activities with new partners. The following are examples and updates of some long-standing CSTS consultations as well as some new activities.

WHITE HOUSE OFFICE

In 2019, the Director was invited by the White House to serve as the Risk Identification Section Lead on the Research Line of Effort (LOE) for Executive Order (EO) 13861 “*National Roadmap to Empower Veterans and End Suicide.*”

DEPARTMENT OF DEFENSE

Center Scientists consulted with a Tri-Service Nursing Research Program (TSNRP) workgroup to discuss clinical practice guidelines for transport of behavioral health casualties and distressed medical/surgical casualties within and out of theater. They offered perspectives on current practice and presented Psychological First Aid principles as a framework around which to organize their guidelines. In addition,

Center scientists were asked to author several chapters in the TSNRP-driven “*Battlefield Nursing Handbook*” on topics such as Combat and Operational Stress Control, Crisis Leadership, and Health Personnel Self-Care.

CSTS assisted the Navy Bureau of Medicine and Surgery in efforts to enhance their ORION database, which provides ongoing assessment and follow-up for Sailors involved in disaster events, such as collision of naval vessels, as well as suicide events within units.

FEDERAL BUREAU OF INVESTIGATION (FBI)

CSTS began consultations with the leadership of the FBI’s Victims Services Division around the impact of death notification on victims’ families following criminal events and mass casualties, as well as the paucity of standardized death notification training across the nation. CSTS Scientists shared professional education materials developed for health care providers about death notification with members of the FBI’s Victims Services Division. It is anticipated that consultation will continue in the coming year to deepen



CSTS scientists and staff at the Canadian Embassy in Washington, DC for the NATO meeting on Personalized Medicine in Mental Health and Performance.

the collaboration regarding death notification, and to expand consultation to other related topics.

DRUG ENFORCEMENT ADMINISTRATION (DEA)

CSTS continued its long-standing relationship with the DEA, and a Center Scientist was asked again to serve as the lead speaker for their annual Reintegration Seminar. This event brings agents from around the country who recently returned from high-threat overseas assignments (as well as their spouses) to participate in a four-day seminar that provides knowledge and experiential activities to assist agents in the process of identifying and overcoming reintegration challenges. The presentation to 30 agents and 11 spouses addressed understanding and managing the impact of stress and trauma in their roles as agents, spouses, parents, employees, and supervisors. This activity continues an ongoing partnership with the Department of Justice.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (DHHS)

DHHS disaster and trauma responsibilities overlap considerably with the activities of CSTS. The primary partners of the Center at DHHS are the Assistant Secretary for Preparedness and Response (ASPR) and the Substance Abuse and Mental Health Services Administration (SAMHSA).

In 2019, CSTS provided additional DHHS consultations, including the contribution of behavioral health subject-matter expertise and technical input for the “*Tick-Borne Disease Working Group 2018 Report to Congress.*” This document was designed to guide U.S. Government policy regarding this increasing public health threat, which is associated with significant adverse neuropsychiatric sequelae.

Assistant Secretary for Preparedness and Response (ASPR)

CSTS continues to work in close collaboration with ASPR staff and leadership on a regular basis. This long-standing relationship allows the Center to



Dr. Wynn presenting at the NATO meeting on Personalized Medicine in Mental Health and Performance.

enhance awareness of existing and emerging federal issues and initiatives and to provide evidence-based consultation and information sharing around issues related to disasters and emergencies.

Substance Abuse and Mental Health Services Administration (SAMHSA)

SAMHSA has been one of the Center’s partners since SAMHSA’s founding more than 25 years ago. SAMHSA is the lead federal agency responsible for supporting and improving national mental health services. CSTS provides emerging evidence-based articles and materials to assist SAMHSA in their national leadership role. In 2019, a Center Associate Director continued to serve on the Disaster Distress Helpline (DDH) Steering Committee. In addition, CSTS leadership provided guidance on the needs of people with existing mental illness in disasters and wrote an article for their publication, “*The Dialogue,*” for SAMHSA’s Disaster Technical Assistance Center (DTAC). CSTS leaders were sought out by SAMHSA to serve as subject matter experts in reviewing their DTAC materials related to disasters and substance use.

THE NATIONAL CENTER FOR DISASTER MEDICINE AND PUBLIC HEALTH (NCDMPH)

CSTS maintained a strong and growing partner-

ship with NCDMPH. In 2019, CSTS and NCDMPH continued their collaboration by significantly updating and restructuring the 2014 cooperative publication entitled, *Curriculum Recommendations for Disaster Health Professionals: Disaster Behavioral Health*. In a continuation of a several year collaboration, two CSTS leaders presented a seminar entitled, “Critical Concepts in Disaster Behavioral Health” to interdisciplinary MPH students. As in prior years, two members of the Center’s leadership team served as Associate Editors for the journal *Disaster Medicine and Public Health Preparedness*, a publication affiliated with NCDMPH.

PROFESSIONAL ORGANIZATIONS

NATIONAL ASSOCIATION OF STATE MENTAL HEALTH PROGRAM DIRECTORS (NASMHPD)

The Center’s nearly two-decade-long relationship with NASMHPD continues to thrive. NASMHPD is a membership organization representing state mental health authorities (Commissioners) responsible for preparedness, response, and recovery from large- and small-scale disasters. CSTS assists the Commissioners in addressing the many challenges inherent in those systems, including issues faced by military families and veterans who are served by the state public mental health systems. In 2019, NASMHPD facilitated CSTS consultation to specific states and localities following disasters and community violence events. CSTS and NASMHPD leadership were in frequent contact throughout the year to identify and address information on disaster response. NASMHPD remains a key distribution and utilization vehicle for the Center’s targeted public information products.

NATIONAL CHILD TRAUMATIC STRESS NETWORK (NCTSN)

The Center continued to work with NCTSN in partnering with the Network’s Military and Veteran

Families Program in their efforts to develop and implement trauma-informed, evidenced-based interventions and approaches for military children and families. CSTS also served as a NCTSN Treatment and Services Adaptation Center (Category II site) by providing expertise on specific types of traumatic events experienced by military families, as well as serving as a resource for programs and providers that specialize in treatment and services for military communities.

MILITARY CHILD EDUCATION COALITION (MCEC)

MCEC’s mission is to support the educational, developmental, and social-emotional needs of military-connected children worldwide. In 2019, CSTS co-sponsored a pre-conference workshop with NCTSN at MCEC’s annual meeting in Washington, DC. This event brought together expert researchers and practitioners to discuss approaches to challenges faced by military and veteran children and families, as well as positive youth development strategies.

NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE (NASEM)

A CSTS Scientist participated on the National Academies of Sciences, Engineering, and Medicine Committee on Military Family Well-being. Committee participation resulted in the NASEM publication, *Strengthening the Military Family Readiness System for a Changing American Society*, a report commissioned by the DoD’s Military Community and Family Policy (MC&FP) office to describe the challenges and opportunities facing military families and ways to protect them.

Additionally, a senior CSTS Scientist moderated the discussion panel titled “Policy Leaders Driving Mental Health Legislation and its Impact on Health Professional Education.” This panel was part of a workshop sponsored by NASEM’s Global Forum on Innovation in Health Professional Education.

THE AMERICAN PSYCHIATRIC ASSOCIATION (APA)

CSTS personnel helped initiate the APA's efforts in disaster psychiatry by establishing its Committee on Disaster Psychiatry in 1992, and has remained actively involved ever since. CSTS works with the APA and other national medical associations to educate and train health professionals in disaster mental health. In 2019, CSTS Scientists provided formal and informal disaster consultation and education resources to APA District Branches in response to a wide range of disaster events, including climate-related disasters, such as hurricanes and wildfires as well as mass violence and terrorist events in the U.S. and Canada. CSTS also provided education and consultation support to the government of New Zealand to support their response to the largest mass shooting in their country's history. Further, CSTS Scientists served as consultants and contributed resources on enhancing preparedness, response, and recovery following disasters. CSTS education fact sheets were important resources for members, District Branches, and partner organizations, assisting them in rapidly disseminating critical, time-sensitive, and actionable information to optimize the well-being of patients and other community members.

At the APA Annual Meeting, CSTS Scientists presented at a sold-out half-day course on disaster mental health, which addressed fundamental issues such as psychological and behavioral responses to disasters, vulnerable populations, and evidence-based early interventions to reduce distress and enhance well-being. Topical areas included modules on climate-related disasters, mass violence, and pandemics. The audience of 48 psychiatrists and other mental health professionals from around the world took part in the course, which offered a blend of didactic learning, interactive polling, and case-based small group exercises to reinforce content.

In addition, a Center Senior Scientist collaborated with colleagues from the WRNMMC, Yale University, and the Veterans Health Administration to present two workshops at the APA Annual Meeting. The workshops presented communication strategies for physicians to better understand risk deci-

sion-making by their patients concerning firearms ownership and storage practices, and to help move their patients toward safer alternatives.

The Center Assistant Director served as Chair of APA's Disaster Committee. In this role, he oversaw the work of a newly formed Caucus on Climate Change and Mental Health. The Caucus delivered presentations and engaged healthcare organization partners to enhance public health education about the adverse effects and mitigation strategies with respect to climate-related disasters. The Caucus also initiated development of toolkits on mitigating adverse impacts of extreme heat and other consequences of a changing global climate.

Additional 2019 APA highlights:

- A CSTS Scientist hosted the annual Society of Uniformed Services Psychiatrists (SUSP) meeting, the military branch of the APA. The meeting provided content ranging from disaster and global mental health to monitoring outcomes in active duty patients.
- A CSTS Scientist chaired an APA panel session titled, "Serving the Underserved through the Medical Review of Systems and the Physical Exam." This panel was selected for publication as a textbook.
- A CSTS Scientist advised the APA's Council on Advocacy and Government Relations on future mental health advocacy priorities.
- A senior CSTS Scientist served on an APA panel session on ethical issues in supervising psychiatric residents conducting psychotherapy.

ADDITIONAL CONSULTATIONS

A senior CSTS leader served as an adviser to Harvard University's Schwartz Center for Compassionate Care, which provides training on enhancing healthcare personnel well-being after adverse events to more than 1,000 medical centers globally. The Schwartz Center requested that a Center Scientist serve as a subject-matter expert and consultant to help guide their development of a toolkit aimed at addressing distress and other adverse reactions experienced by healthcare providers following mass violence events.

The CSTS Director and the Psychiatry Department Chair provided consultation to the CEO of RallyPoint, to explore ways to improve suicide prevention and better support veterans and Service members. RallyPoint is an online platform with 1.6 million registered users, of which approximately 90% are Service members or veterans.

CSTS Associate Directors were contacted by the Commissioner of the Virginia Department of Behavioral Health & Developmental Services (VADBHDS) regarding the mass shooting in Virginia Beach that had occurred two days prior. Consultation was requested and provided regarding what to anticipate in the aftermath of the event. CSTS provided follow-up consultation to the Director of Emergency Management at the VADBHDS.

INTERNATIONAL OUTREACH

The reach of CSTS consultation activities extends beyond the nation's borders to the international community. The following are examples of CSTS international activities in 2019.

International Ministerial 5-Eyes Alliance

CSTS collaborated with a mental health-focused task group of the International Ministerial 5-Eyes Alliance, comprised of military- and veteran-related

centers from Australia, the United Kingdom, New Zealand, Canada, and the United States. This is a core group of centers and departments that joined together to work on defense and veteran mental health. CSTS worked closely with the individuals, centers, and departments in this group. Several Center leaders participated in a meeting of the International 5-Eyes Mental Health Research Innovation Collaborative on “*Military and Veteran Mental Health*.” This meeting brought together 30 senior researchers and clinicians from the five countries listed previously who advise their respective governments. The focus of the meeting was to discuss current issues and future directions for military and veteran mental health and well-being. The results of this meeting will inform recommendations made to 5-Eyes Ministers. In addition, based on this collaboration, an article was published in the *International Review of Psychiatry*, entitled “Treatment of Military-Related Post-Traumatic Stress Disorder: Challenges, Innovations, and the Way Forward.”

In addition, the Center Director participated in the International Ministerial (5-Eyes) Centres of Excellence Conference on Veterans' Issues in Sydney, Australia. The conference involved the Australian Government Minister for Veterans' Affairs and delegations from all member countries, and discussed veterans mental health issues and transition from military and civilian life. The CSTS Director also presented the work CSTS has been doing during the “Innovative Research Consortium,” an international working group on military and veteran health.

North Atlantic Treaty Organization (NATO)

A Center Scientist hosted the NATO Personalized Medicine in Mental Health and Performance Research Task Group two-day meeting on the topic of Precision Medicine in Human Performance at the Canadian Embassy in Washington, DC. This international meeting, sponsored in part by CSTS, focused on identification of cutting-edge precision medicine techniques that will lead to improvements in how NATO member nations optimize performance, improve prevention, and expedite diagnoses and treatment as well as maximize cognitive performance (e.g., focused concentration, mental



endurance) related to military-relevant mission performance. International representation included Canada, the Netherlands, and the United Kingdom, along with a number of U.S. partner institutions.

A senior CSTS Scientist coordinated and hosted an international NATO meeting held at the University of Southern California in Los Angeles, CA. The meeting, titled “*Leveraging Technology in Military Mental Health: Virtual Reality, Neuromodulation, and Telehealth*” included participants from the United States, Canada, the Netherlands, and Australia.

In addition, this senior CSTS Scientist co-chaired a panel meeting of the NATO Research Task Group on Personalized Medicine in Mental Health and Performance. The meeting, which was held at King’s College London, focused on personalized mental health for military Service members and included speakers and panel members from the United States, the United Kingdom, the Republic of Ireland, the Netherlands, and Australia.

Defense Institute for Medical Operations (DIMO)

CSTS supported the Defense Institute for Medical Operations (DIMO) by providing a CSTS Scientist as the team lead and subject matter expert to deliver a five-day course in Nigeria. The U.S. five member team, comprised of active duty mental health providers, trained 26 students in the tenets of military psychiatry with a focus on combat stress and post-traumatic stress disorder. The Nigerian learners were comprised of highly skilled psychiatrists, clinical psychologists, social workers, and psychiatric nurses with extensive combat experience, as well as emergency responders from the National Fire Service and the Nigeria Security and Civil Defense Corps. The course helped initiate Nigeria’s tri-service, multi-disciplinary collaboration, to include increased awareness of capabilities and operational approaches with the intent of ongoing project planning and support. The instruction also sparked interest in training Service members and emergency responders in Psychological First Aid.



Dr. Morganstein presenting at the NATO meeting on Personalized Medicine in Mental Health and Performance.

Culturally-specific tool development, including screening questionnaires and treatment protocols, was a high-interest item and several learners developed plans to incorporate these questionnaires and protocols into their clinical interviews.

Phoenix Australia, Centre for Posttraumatic Mental Health

A senior CSTS Scientist hosted two leaders from Phoenix Australia, Centre for Posttraumatic Mental Health, for a two-day visit to meet with CSTS leadership and various CSTS study teams to learn about current research and other activities at CSTS. The visit included discussion of topics of mutual interest with a focus on harnessing and encouraging new collaborations, and a presentation titled, “Phoenix Australia: Update on Research and Translation Work with Australian Military and High Risk Organisations.”

New Zealand Surgeon General’s Office

The Center was contacted by the New Zealand Surgeon General’s Office to support their response, recovery, and outreach efforts following the deadly mass shootings at two mosques in Christchurch, NZ.

Publications

(Names in bold text are CSTS personnel)

JOURNAL ARTICLES

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BOOK CHAPTERS

- Cozza, S. J.**, Harrington-LaMorie, J., & **Fisher, J. E.** (2019). U.S. Military Service Deaths: Bereavement in Surviving Families. In E. L. Weiss, C. A. Castro (Eds.), *American Military Life in the 21st Century: Social, Cultural, and Economic Issues and Trends*. Santa Barbara, CA: ABC-CLIO.
- Morganstein, J. C.**, **West, J. C.**, & **Ursano, R. J.** (2019). Work Associated Trauma. In M. B. Riba, S. Parikh, J. Greden (Eds.), *Mental Health in the Workplace: Strategies and Tools to Optimize Outcomes*. Cham, Switzerland: Springer Nature Publishing Company.
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Presentations, Briefings, Interviews, and Awards

(The names in bold text are CSTS personnel.)

PRESENTATIONS

- Understanding and addressing the needs of bereaved military families. **Cozza, S. J.**, & Shear, M. K. Presented as a webinar at the TAPS Institute for Hope and Healing, Washington, DC, January 2019.
- Disaster behavioral health: Critical concepts. **Flynn, B. W.**, & **Morganstein, J. C.** Presentation to MPH students at the Uniformed Services University, Bethesda, MD, January 2019.
- Considerations on resilience: Building, fostering, sustaining resilience from the perspective of trauma, terrorism and disaster. **Ursano, R. J.** Plenary lecture at the 5th National University of Singapore International Academic Psychiatry Conference 2019: Resilience Across the Age Continuum, Singapore, January 2019.
- Resilience in adversity: Trauma, disaster and recovery. **Ursano, R. J.** Plenary lecture at the 5th National University of Singapore International Academic Psychiatry Conference 2019: Resilience Across the Age Continuum, Singapore, January 2019.
- PTSD, suicide, TBI... DSM and other trauma disorders. **Ursano, R. J.** Presented at the Department of Psychiatry Grand Rounds at MedStar Georgetown University Hospital, Washington, DC, February 2019.
- Trends in substantiated U.S. Army child maltreatment reports. **McCarroll, J. E.** Presented at the 34th Annual International Conference on Child and Family Maltreatment, San Diego, CA, February 2019.
- Documented family violence and risk of suicide attempt among U.S. Army Soldiers. **Whalen, R. J.** Presented at the 34th Annual International Conference on Child and Family Maltreatment, San Diego, CA, February 2019.
- Types, subtypes and severity of substantiated child neglect in U.S. Army communities. **Cozza, S. J.** Presented at the 34th Annual International Conference on Child and Family Maltreatment, San Diego, CA, February 2019.
- Impact of the previous night's sleep disturbances on post-traumatic stress symptoms among individuals with and without post-traumatic stress disorder. **Biggs, Q. M.**, **Ursano, R. J.**, **Wang, J.**, **Wynn, G. H.**, **Krantz, D. S.**, Carr, R. B., **Dacuyan, N. M.**, **Pokorny, K.**, **Gover-Chamlou, A.**, **Martinez, S.**, & **Fullerton, C. S.** Poster presentation at the 40th Annual Meeting of the Society of Behavioral Medicine, Washington, DC, March 2019.
- Influence of number of awakenings during the previous 1-3 nights on post-traumatic stress symptoms among individuals with PTSD. **Wang, J.**, **Ursano, R. J.**, **Biggs, Q. M.**, **Krantz, D. S.**, **Wynn, G. H.**, **Carr, R. B.**, **Gover-Chamlou, A.**, **Martinez, S.**, **Pokorny, K.**, **Stephens, T. B.**, & **Fullerton, C. S.** Poster presentation at the 40th Annual Meeting of the Society of Behavioral Medicine, Washington, DC, March 2019.
- Nightmare deconstruction and reprocessing: Proof of concept of a novel treatment for PTSD-related nightmares and insomnia. **Spangler, P.**, **West, J.**, **Benedek, D.**, **Dempsey, C.**, **Schuler, K.**, **Paxton, M.**, **Asabre, E.**, **Phares, A.**, & **Canales, J.** Poster presentation at the 40th Annual Meeting of the Society of Behavioral Medicine, Washington, DC, March 2019.
- Relationship of perceived safety to behavioral change following active shooter events. **Herberman Mash, H. B.**, **Fullerton, C. S.**, & **Ursano, R. J.** Poster presentation at the 40th Annual Meeting of the Society of Behavioral Medicine, Washington, DC, March 2019.
- Mental health and nuclear and radiologic emergencies: What to expect, surveillance, triage and coordinating care. **Ursano, R. J.** Presented at the Workshop on Challenges in Initiating and Conducting Long-Term Health Monitoring of Populations Following Nuclear and Radiological Emergencies in the United States at the National Academies of Sciences, Engineering and Medicine, Washington, DC, March 2019.
- Helping people after disasters: Impacts, interventions, and future directions. **Morganstein, J. C.** Presented at the 2nd Annual Hero's Journey Home Symposium, John P. Mayhugh Foundation, U.S. Capitol, Washington, DC, March 2019.
- Pathways of risk and recovery in military families. **Cozza, S. J.** Presented at the 2nd Annual Hero's Journey Home Symposium, John P. Mayhugh

- Foundation, U.S. Capitol, Washington, DC, March 2019.
- Understanding and addressing the needs of bereaved military family members. **Cozza, S. J.** Presented at The Cohen Veterans Network, Silver Spring, MD, April 2019.
- Mental health and nuclear emergencies: What to expect, surveillance, triage and coordinating care. **Ursano, R. J.** Webinar presentation at The 4th WHO REMPAN Webinar- Mental Health Impact of Nuclear Emergencies, Geneva, Switzerland, April 2019.
- Mental health and psychosocial challenges for victims and responders during international disasters. **Morganstein, J. C.** Presentation to MPH students at the Uniformed Services University, Bethesda, MD, April 2019.
- An introduction to disaster psychiatry. **Morganstein, J. C.** Presentation to Psychiatry residents at the NCC Psychiatry Residency Training Program, Bethesda, MD, April 2019.
- Effect of prior hurricane experiences on preparedness in Florida Department of Health workers. **Herberman Mash, H. B., Morganstein, J. C., Fullerton, C. S., Wang, L., Liu, A. G., Farooq, S., & Ursano, R. J.** Poster presentation at the 14th Annual Amygdala, Stress and PTSD Conference, Center for the Study of Traumatic Stress, Department of Psychiatry, Uniformed Services University, Bethesda, MD, April 2019.
- Impact of the previous night's sleep disturbances on post-traumatic stress symptoms among individuals with and without post-traumatic stress disorder. **Biggs, Q. M., Ursano, R. J., Wang, J., Wynn, G. H., Krantz, D. S., Carr, R. B., Dacuyan, N, M., Pokorny, K., Gover-Chamlou, A., Martinez, S., & Fullerton, C. S.** Poster presentation at the 14th Annual Amygdala, Stress, and PTSD Conference: Risk, Resilience, and Recovery, Uniformed Services University, Bethesda, MD, April 2019.
- Influence of number of awakenings during the previous 1-3 nights on post-traumatic stress symptoms among individuals with PTSD. **Wang, J., Ursano, R. J., Biggs, Q. M., Krantz, D. S., Wynn, G. H., Carr, R. B., Gover-Chamlou, A., Martinez, S., Pokorny, K., Stephens, T. B., & Fullerton, C. S.** Poster presentation at the 14th Annual Amygdala, Stress, and PTSD Conference: Risk, Resilience, and Recovery, Uniformed Services University, Bethesda, MD, April 2019.
- Longitudinal changes in children's mental health conditions and physical injury rates following father death. **Ogle, C. M., Fisher, J. E., Zhou, J., Gover-Chamlou, A. N., & Cozza, S. J.** Poster presentation at the 14th Annual Amygdala, Stress, and PTSD Conference: Risk, Resilience, and Recovery, Uniformed Services University, Bethesda, MD, April 2019.
- Prevalence of health conditions and healthcare utilization in treatment-seeking, bereaved military widows: A prospective, case-controlled, longitudinal study. **Hefner, K., Fisher, J. E., Zhou, J., Burris, A., & Cozza, S. J.** Poster presentation at the 14th Annual Amygdala, Stress, and PTSD Conference: Risk, Resilience, and Recovery, Uniformed Services University, Bethesda, MD, April 2019.
- Risk and resilience of lifetime stressful experiences among US Army soldiers at risk for suicide: Results from the Army Study to Assess Risk and Resilience Among Servicemembers (Army STARRS). **Dempsey, C. L., Benedek, D. M., Zuromski, K. L., Nock, M. K., Ng, T. H. H., Riggs-Donovan, C. A., Broshek, C., Martinez, S., & Ursano, R. J.** Poster presentation at the 14th Annual Amygdala, Stress, and PTSD Conference: Risk, Resilience, and Recovery, Uniformed Services University, Bethesda, MD, April 2019.
- Safety and confidence in law enforcement during terrorist-related events: Association with daily life activities. **Herberman Mash, H. B., Fullerton, C. S., Morganstein, J. C., Flynn, B. W., & Ursano, R. J.** Poster presentation at the 14th Annual Amygdala, Stress and PTSD Conference, Center for the Study of Traumatic Stress, Department of Psychiatry, Uniformed Services University, Bethesda, MD, April 2019.
- Understanding and addressing the needs of bereaved military family members. **Cozza, S. J.** Presented as a webinar at Columbia University's Center for Complicated Grief, New York, NY, April 2019.
- Effect of gender, perceived workplace training, and mental health care use on psychological distress following the 2004 Florida hurricanes. **Liu, A. G., Farooq, S., Herberman Mash, H. B., Fullerton, C. S., & Ursano, R. J.** Poster presentation at the 31st Annual Convention of the Association for Psychological Science, Washington, DC, May 2019.
- Risk and resilience of lifetime stressful experiences among US Army soldiers at risk for suicide. **Dempsey, C. L., Benedek, D. M., Zuromski, K., Nock, M. K., Ng, T. H., Riggs-Donovan, C. A., Broshek, C., Martinez, S., Exley, S., & Ursano, R. J.** Poster presentation at the 31st Annual Convention of the Association for Psychological Science, Washington, DC, May 2019.
- Testing the utility of mobile applications to support grief

- adaptation in military survivors. **Fisher, J. E., Liu, A. G., Skritskaya, N., Farooq, S., Gorscak, B. J., Hefner, K., Ogle, C., Gribbin Bloom, C., Bottex, G., Cozza, S. J., & Shear, M. K.** Poster presentation at the 31st Annual Convention of the Association for Psychological Science, Washington, DC, May 2019.
- Disaster psychiatry review and updates: Mass violence, Ebola, and climate change. **Morganstein, J. C., West, J. C., Napoli, J., Stoddard, F., & Ursano, R. J.** Course presented at the Annual Meeting of the American Psychiatric Association, San Francisco, CA, May 2019.
- Outside the system: Risk factors for suicide attempt among U.S. Army soldiers with no history of mental health diagnosis. **Naifeh, J. A., Herberman Mash, H. B., Stokes, C. M., Fullerton, C. S., Aliaga, P. A., Riggs-Donovan, C. A., Ng, T. H. H., Stein, M. B., Kessler, R. C., & Ursano, R. J.** Poster presentation at the 31st Annual Convention of the Association for Psychological Science, Washington, DC, May 2019.
- Military healthcare systems throughout NATO. **Wynn, G. H., Berendsen, B. J., & Jetly, R.** Presented at the Tri-Service Conference of the Society of Uniformed Services Psychiatrists, San Francisco, CA, May 2019.
- Nightmare deconstruction and reprocessing: Feasibility of a novel treatment for PTSD-related nightmares and insomnia. **Spangler, P., West, J. C., Benedek, D. M., Dempsey, C., Schuler, K., Paxton, M., Asabre, E., Phares, A., & Canales, J.** Poster presentation at the 31st Annual Convention of the Association for Psychological Science, Washington, DC, May 2019.
- Fear of death biases reporting on mental health assessments. **Russell, D. W. & Russell, C.** Poster presentation at the 31st Annual Convention of the Association for Psychological Science, Washington, DC, May 2019.
- Deployment and suicide: Is there an association? **Wynn, G. H.** Presented at the Congress of the International Society of Travel Medicine meeting, Washington, DC, May 2019.
- Combat operational stress and mental health issues in military deployment. **Benedek, D. M.** Presented at the 16th Congress of the International Society of Travel Medicine, Washington, DC, May 2019.
- Update from Army STARRS. **Ursano, R. J.** Presented at the 2019 Artiss Symposium, Bethesda, MD, June 2019.
- Disaster psychiatry: Finding structure in chaos. **Ursano, R. J.** Presented as a keynote at the Psychiatry Dimensions of Disaster: Training Course II, Toronto, Canada, June 2019.
- Politics, identity, and therapy in the VA behavioral health environment. **Spangler, P.** Presented at the Veterans Affairs Palo Alto Health Care System Psychology Continuing Education & Social Work Service Workshop, Providing Clinical Care in a Polarized America: Politics in Mental Health Practice, Palo Alto, CA, June 2019.
- Feasibility of a novel treatment for PTSD nightmares: Integrating psychometric physiologic, and genetic data. **Spangler, P., Azad, A., West, J., Benedek, D., Zhang, L., Gill, J., Dempsey, C., et al.** Panel presentation at the 50th Annual International Meeting of the Society for Psychotherapy Research, Buenos Aires, Argentina, July 2019.
- Science of stress and trauma: Impact and interventions. **Morganstein, J. C.** Presented at the Reintegration from High-Threat Posts and Military Deployments Seminar, Drug Enforcement Administration, Department of Justice, Quantico, VA, July 2019.
- Disasters and mental health: Impact, vulnerability, and early interventions. **Morganstein, J. C.** Presented at the Clinical Communities Speaker Series on Innovations in Health Care from Centers of Excellence and Communities of Practice Groups, Defense Health Agency, Silver Spring, MD, August 2019.
- Psychiatric dimensions of disaster and the impact of climate change. **West, J. C.** Presented to the Southern Psychiatric Association, Louisville, KY, August 2019.
- Prevalence of mental health conditions and physical injury rates associated with paternal death in military children. **Ogle, C. M., Fisher, J. E., Zhou, J., & Cozza, S. C.** Presented at the 66th Annual Meeting of the American Academy of Child and Adolescent Psychiatry, Chicago, IL, October 2019.
- Nightmare deconstruction and reprocessing: Integrating collection of physiologic stress indicators via wearable technology and genomic analyses in pilot testing a psychotherapy for PTSD-related nightmares. **Spangler, P., Azad, A., West, J., Zhang, L., Gill, J., Benedek, D., Dempsey, C., et al.** Poster presentation at the Technology, Mind, and Society Conference, American Psychological Association, Washington, DC, October 2019.
- Child neglect types in US Army communities and associated risk factors. **Cozza, S. J., Fisher, J. E., Ogle, C. M., & Zhou, J.** Presented at the 66th Annual Meeting of the American Academy of Child and Adolescent Psychiatry, Chicago, IL, October 2019.
- Exposure to and management of human remains: Post-traumatic consequences and pathways of recovery. **Cozza, S. J., Flynn, B. W., & Biggs, Q. M.** Panel presentation at the 35th Annual Meeting of the International Society for Traumatic Stress Studies, Boston, MA, November 2019.
- Bereavement outcomes after sudden and violent losses: Suicide-loss survivors compared to survivors of accident and combat loss. **Fisher, J. E., Zhou, J., &**

Cozza, S. J. Poster presentation at the 35th Annual Meeting of the International Society for Traumatic Stress Studies, Boston, MA, November 2019.

Combat exposure, PTSD, and other potential risk factors for the transition from recent suicide ideation to suicide attempt in U.S. Army Soldiers. **Naifeh, J. A., Dempsey, C. L., Bartolanzo, D., Herberman Mash, H. B., Fullerton, C. S., & Ursano, R. J.** Poster presentation at the 35th Annual Meeting of the International Society for Traumatic Stress Studies, Boston, MA, November 2019.

Posttraumatic stress disorder: Updates on assessment and management. **Morganstein, J. C.** Presented as part of the Saint Luke Institute Continuing Education Series, Silver Spring, MD, November 2019.

Relationship of hurricane-related concerns to hurricane preparedness and subsequent mental distress. **Liu, A. G., Mash, H. B. H., Fullerton, C. S., Mullins-Hussain, B., & Ursano, R. J.** Poster presentation at the 35th Annual Meeting of the International Society for Traumatic Stress Studies, Boston, MA, November 2019.

Influence of number of awakenings during the previous 1-3 nights on post traumatic stress symptoms among individuals with PTSD. **Wang, J., Ursano, R. J., Biggs, Q. M., Krantz, D. S., Wynn, G. H., Carr, R. B., Gover-Chamlou, A., Martinez, S., Pokorny, K., Stephens, T. B., & Fullerton, C. S.** Poster presentation at the Neuroscience 29th Annual Open House, Uniformed Services University, Bethesda, MD, December 2019.

Impact of the previous night's sleep disturbances on post traumatic stress symptoms among individuals with and without post traumatic stress disorder. **Biggs, Q. M., Ursano, R. J., Wang, J., Wynn, G. H., Krantz, D. S., Carr, R. B., Dacuyan, N. M., Pokorny, K., Gover-Chamlou, A., Martinez, S., & Fullerton, C. S.** Poster presentation at the Neuroscience 29th Annual Open House, Uniformed Services University, Bethesda, MD, December 2019.

BRIEFINGS/INTERVIEWS

- Dr. Ursano and Dr. Benedek gave an overview presentation about CSTS and provided consultation to the Virginia Department of Veterans Services Interagency Executive Strategy Committee (IESC). The Committee is tasked with considering strategies aimed at reducing suicide and self-harm as part of the Governor's Challenge to Prevent Suicide among Military Service Members, Veterans and their Families.
- Dr. Stephen Cozza participated in a *Connecting Vets* radio interview in which he discussed concepts

of grief and military family bereavement. He also discussed CSTS's ongoing study "Stepping Forward in Grief".

- Dr. Ursano was interviewed by Dr. Michael Blumenfeld of *PsychiatryTalk* for a podcast. The podcast covered a variety of topics including suicide, PTSD and the STARRS research program.
- Dr. Whalen provided members of a Defense Health Board Child Abuse and Neglect Subset Meeting an overview of CSTS with emphasis on our Child and Family Program and an overview of Dr. Stephen Cozza's ongoing study of child maltreatment in DoD families.
- Dr. Stephen Cozza participated in a podcast with Dr. Richard Lerner from Tufts University sponsored by the Military Child Education Coalition on "Building Convoys of Care for Military Children."
- Dr. Stephen Cozza participated in a podcast with Patricia Barron at the Association of the United States Army (AUSA) focusing on supporting military children and families and included a discussion of the Center's "Stepping Forward in Grief" study.
- Dr. Ursano was interviewed by Fort Meade's newspaper, *Soundoff!* on his work on Army STARRS and suicide prevention.
- Dr. Morganstein presented an overview of CSTS activities to the newly formed Indo-Pacific Research Alliance for Military Medicine during their visit to USU. This collaboration included a range of DoD and other interagency partners seeking to share common interests and develop collaboration in biomedical research.
- Dr. Ogle provided consultation to the American Association for the Advancement of Science (AAAS) Center for Scientific Evidence in Public Issues (EPI Center) regarding how findings from developmental science can be more effectively accessed and integrated into the decision-making process throughout the judicial system. The EPI Center is a new AAAS initiative designed to deliver clear, concise, and actionable scientific evidence to policy makers and other decision makers.
- Dr. Benedek was quoted in articles on *CNN*, *Fox News*, *US News and World Reports*, among others, regarding the findings in the publication, "Association of Firearm Ownership, Use, Accessibility and Storage Practices With Suicide Risk Among US Army Soldiers."
- Dr. Stephen Cozza was interviewed by a journalist from *Reuters* who is writing an article on a Gold Star widow. The conversation revolved around research on bereaved military family members' PTSD and grieving process.
- Dr. Benedek was interviewed by Dr. Carol Bernstein,

past President of the American Psychiatric Association, on Sirius XM *Doctor Radio* regarding the recent publication “Association of Firearm Ownership, Use, Accessibility and Storage Practices with Suicide Risk among U.S. Army Soldiers.”

- Dr. Stephen Cozza participated in a podcast regarding the recently released National Academies of Sciences, Engineering, and Medicine report “Strengthening the Military Family Readiness System for a Changing American Society.”
- Dr. Wynn was interviewed by *Medscape Psychiatry* for their article “Five-Minute Injection May Offer an Effective Option for PTSD.”
- STARRS methods, findings and recommended actions for risk reduction and resilience-building to prevent suicide and suicide-related behaviors in DoD and veterans were presented to the Personnel Subcommittee of the U.S. Senate Armed Services Committee as testimony during a hearing on Service member, family, and veteran suicides and prevention strategies.
- Dr. Choi received an intramural New Opportunity Research award for his proposal, “Interaction between Intravenous Ketamine and Opioid on Fear and Stress in Rats.”
- Dr. Vance’s publication in *Circulation: Cardiovascular Quality and Outcomes*, and the related news release titled: “Veterans with mental health conditions have higher risk of heart disease, stroke” generated 5,574,880 media impressions and 89,131 views on American Heart Association social media channels. This exceeded the average number of views for this journal. Media impressions are mentions of the study in consumer and trade media in print publications, online, or broadcast media. It does not include citations in peer-reviewed scientific journals.

AWARDS AND APPOINTMENTS

- Dr. Ursano was awarded the 2019 Lifetime Achievement Award of the Association of Military Surgeons of the United States (AMSUS). The AMSUS Lifetime Achievement Award is for a distinguished career of excellence in development, invention, and innovation in healthcare that is recognized internationally

and makes significant fundamental contributions of lasting impact to better health outcomes in federal healthcare. AMSUS was founded by Congress in 1903 and is the Society of Federal Health Professionals.

- Dr. Morganstein received a Certificate of Appreciation for outstanding service and dedication in supporting Capital Area Provider Team 3 of the U.S. Public Health Service for the “Independence Day Support Mission” deployment. The award was granted by CAPT Chertow, Team Commander, Capital Area Provider Team 3, U.S. Public Health Service.
- Dr. Vance was promoted to a member of the APA Council on Advocacy and Government Relations (CAGR). In this capacity, she assumed leadership of CAGR’s mentorship program for APA fellows. She also became CAGR’s liaison with the Council on Medical Education and Lifelong Learning.
- Dr. Vance was selected for the American Psychoanalytic Association Fellowship, an early-career initiative for future leaders in mental health to learn more about and receive mentorship in psychoanalysis.
- Dr. Ursano was invited by the White House to serve as the Risk Identification Section Lead on the Research Line of Effort (LOE) for Executive Order (EO) 13861 “National Roadmap to Empower Veterans and End Suicide.”
- Dr. Stephen Cozza served as a member on the National Academies of Sciences, Engineering, and Medicine Committee on the Well-Being of Military Families.
- Dr. Benedek and Dr. Kelly Cozza served as members of the American Association of Orthopedic Surgeons’ (ASOS) Clinical Practice Guideline workgroup developing the Practice Guideline for Psychosocial Screening of Adult trauma patient
- Dr. Morganstein was asked to serve as an adviser to Harvard University’s Schwartz Center to help guide their development of a tool kit aimed at addressing distress and other adverse reactions experienced by healthcare providers following mass shooting events.
- Dr. Vance was appointed to serve as a member of the APA Workgroup to Evaluate the Editor-in-Chief of APA Publishing Books.

Directors, Scientists, Science Collaborative Members, and Staff

DIRECTORS

Robert J. Ursano, MD

Professor of Psychiatry and Neuroscience
Department of Psychiatry
Director
Center for the Study of Traumatic Stress
Uniformed Services University

David M. Benedek, MD

COL, MC, USA
Chair, Professor
Department of Psychiatry
Associate Director, Consultation and Education
Center for the Study of Traumatic Stress
Uniformed Services University

Stephen J. Cozza, MD

Professor
Department of Psychiatry
Associate Director, Child and Family Program
Center for the Study of Traumatic Stress
Uniformed Services University

Brian W. Flynn, EdD

Adjunct Professor
Department of Psychiatry
Associate Director, Health Systems
Center for the Study of Traumatic Stress
Uniformed Services University

Carol S. Fullerton, PhD

Research Professor
Department of Psychiatry
Scientific Director
Center for the Study of Traumatic Stress
Uniformed Services University

Robert K. Gifford, PhD

Assistant Professor
Department of Psychiatry
Executive Officer and Associate Director, Homeland Security Studies
Center for the Study of Traumatic Stress
Uniformed Services University

Joshua C. Morganstein, MD

CAPT, USPHS
Associate Professor/Assistant Chair
Department of Psychiatry
Assistant Director
Center for the Study of Traumatic Stress
Uniformed Services University

SCIENTISTS

Alvi Azad, DO, MBA

Lt Col, USAF
Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

David M. Benedek, MD

COL, MC, USA
Consultant to the U.S. Army
Surgeon General for Forensic Psychiatry
Chair, Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Quinn M. Biggs, PhD, MPH

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Robert Bossarte, PhD

Adjunct Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Maria Braga, DDS, PhD

Associate Professor
Department of Anatomy, Physiology and Genetics
Center for the Study of Traumatic Stress
Uniformed Services University

Shenglin Chen, PhD

Biostatistician
Department of Psychiatry

Center for the Study of Traumatic Stress
Uniformed Services University

Kwang Choi, PhD

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Kelly L. Cozza, MD, DFAPA, FAPM

Associate Professor
Clinical Clerkship Director
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Stephen J. Cozza, MD

Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Brian Crowley, MD

Adjunct Associate Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Catherine L. Dempsey, PhD, MPH

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Connie C. Duncan, PhD

Research Associate Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Joscelyn E. Fisher, PhD

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic Stress
Uniformed Services University

Brian W. Flynn, EdD
Adjunct Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Michael C. Freed, PhD
Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Carol S. Fullerton, PhD
Research Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Frances Gabbay, PhD
Research Associate Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Robert K. Gifford, PhD
Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Gena L. Glickman, PhD
Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Oscar I. Gonzalez, PhD
CPT, USA
Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Derrick Hamaoka, MD
Lt Col, USAF, MC, FS
Associate Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

**Jill Harrington-LaMorie, DSW,
LCSW**
Senior Field Researcher
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Kathryn Hefner, PhD
Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Harry C. Holloway, MD
Professor of Psychiatry and
Neuroscience
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Marjan G. Holloway, PhD
Associate Professor
Department of Medical & Clinical
Psychology
Center for the Study of Traumatic
Stress
Uniformed Services University

Edmund G. Howe III, MD, JD
Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Luke Johnson, PhD
Adjunct Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Tzu Cheg Kao, PhD
Professor
Department of Preventive Medicine
and Biometrics
Center for the Study of Traumatic
Stress
Uniformed Services University

Elie Karam, MD
Professor and Chairman
Department of Psychiatry
American University, Beirut
Beirut, Lebanon

David S. Krantz, PhD
Professor
Department of Medical and Clinical
Psychology
Center for the Study of Traumatic
Stress
Uniformed Services University

He Li, MD, PhD
Associate Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Xian Liu, PhD
Research Professor
Deployment Health Clinical Center
Walter Reed Army Medical Center

Holly H. Mash, PhD
Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

James E. McCarroll, PhD, MPH
Research Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Eric Meyer II, MD
Maj, USAF, MC
Associate Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Joshua C. Morganstein, MD
CAPT, USPHS
Associate Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

James A. Naifeh, PhD
Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Christin M. Ogle, PhD
Child Research Psychologist
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Darrel A. Regier, MD, MPH
Adjunct Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Dori B. Reissman, MD, MPH
RADM, USPHS
Medical Director
World Trade Center Responder Health
Program
Senior Medical Advisor
National Institute of Occupational
Safety and Health

Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Dale Russell, PhD

Behavioral Science Researcher
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

**Patcho N. Santiago, MD, MPH
CDR, MC, USN**

Psychiatry Residency Program Director
Walter Reed National Military Medical
Center
Associate Dean for Diversity and
Inclusion
School of Medicine
Associate Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Keke L. Schuler, PhD

Clinical Research Psychologist
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Leonard Skipper, PhD

MAJ, MS, USA
Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Patricia Spangler, PhD

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Cara M. Stokes, PhD, MPH

Postdoctoral Fellow
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

John A. Stuart, PhD

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

E. Fuller Torrey, MD

Executive Director
Stanley Medical Research Institute

Robert J. Ursano, MD

Professor of Psychiatry and
Neuroscience
Department of Psychiatry
Director
Center for the Study of Traumatic
Stress
Uniformed Services University

Mary C. Vance, MD, MSc

Assistant Professor of Psychiatry
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Jing Wang, PhD

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Maree J. Webster, PhD

Research Assistant Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University
Director
Laboratory of Brain Research
Stanley Medical Research Institute

Lars Weisaeth, MD

Professor
Division of Disaster Psychiatry
University of Oslo
Oslo, Norway

James (Curt) West, MD

CAPT, MC, USN
Deputy Chair
Associate Professor
Clerkship Director
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Ronald Whalen, PhD, LMSW

Senior Research Social Worker
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

Kathleen Wright, PhD

Former Director (Ret.)
Force Health Protection Program
USAMRU-E
Walter Reed Army Institute of
Research

Gary H. Wynn, MD

COL, MC, USA

Professor
Department of Psychiatry
Senior Scientist
Center for the Study of Traumatic
Stress
Uniformed Services University

Lei Zhang, MD

Associate Professor
Department of Psychiatry
Center for the Study of Traumatic
Stress
Uniformed Services University

**SCIENCE COLLABORATIVE
MEMBERS**

James E. Barrett, PhD

Emeritus Professor and Former
Chairman
Department of Pharmacology and
Physiology
Drexel University
College of Medicine

Paul D. Bliese, PhD

Associate Professor
Department of Management
University of South Carolina
Darla Moore School of Business

Robert Bossarte, PhD

Associate Professor
Department of Behavioral Medicine
and Psychiatry
Director
West Virginia University Injury Control
Research Center
West Virginia University

David Brody, MD, PhD

Professor
Department of Neurology Director
Center for Neuroscience and
Regenerative Medicine
Uniformed Services University

M. Richard Fragala, MD

COL, USAF, MC, FS (Ret.)
Professor
Department of Psychiatry
Uniformed Services University

Matthew J. Friedman, MD, PhD

Professor
Department of Psychiatry
Professor
Department of Pharmacology &
Toxicology
Dartmouth University
Geisel School of Medicine
Director
Leahy-Friedman National PTSD Brain
Bank

Senior Advisor
National Center for Post-traumatic
Stress Disorder
U.S. Department of Veterans Affairs

Harry C. Holloway, MD
COL, MC, USA (Ret.)
Professor Emeritus
Department of Psychiatry
Uniformed Services University

Ronald C. Kessler, PhD
McNeil Family Professor
Department of Health Care Policy
Harvard Medical School

Craig H. Llewellyn, MD
Professor
Department of Military and Emergency
Medicine
Uniformed Services University

Irwin Lucki, PhD
Professor and Chair
Department of Pharmacology &
Molecular Therapeutics
Uniformed Services University

Matthew K. Nock, PhD
Edgar Pierce Professor and Chair
Department of Psychology
Harvard University

Francis O'Conner, MD, MPH
COL, MC, USA
Professor and Chairman
Department of Military and Emergency
Medicine
Uniformed Services University

Harvey B. Pollard, MD, PhD
Professor and Chair
Department of Anatomy, Physiology
and Genetics
Director

Collaborative Health Initiative
Research Program (CHIRP)
Uniformed Services University

Robert M. Post, MD
Head
Bipolar Collaborative Network
Former Chief
Biological Psychiatry Branch
National Institute of Mental Health

David Riggs, PhD
Professor and Chair
Department of Medical Clinical
Psychology
Executive Director
Center for Deployment Psychology
Uniformed Services University

Arieh Y. Shalev, MD
Professor
Department of Psychiatry
New York University Professor
Department of Psychiatry
Hadassah University School of
Medicine
Jerusalem, Israel

Murray B. Stein, MD, MPH
VA San Diego Healthcare
System
Distinguished Professor
Department of Psychiatry
Distinguished Professor
Department of Family Medicine and
Public Health
University of California, San
Diego

Lars Weisaeth, MD
Professor
Division of Disaster Psychiatry
University of Oslo
Oslo, Norway

**DISTINGUISHED FORMER
SCIENCE COLLABORATIVE
MEMBERS & EMERITUS
FRIENDS OF CSTS**

**Herbert A. Hauptman, PhD
(1917-2011)**
1985 Nobel Laureate, Chemistry
President
Hauptman-Woodward Medical
Research Institute
Research Professor
Department of Biophysical Sciences
Adjunct Professor
Department of Computer Science
University of Buffalo

**Joshua Lederberg, PhD,
ForMenRS
(1925-2008)**
1958 Nobel Laureate, Physiology or
Medicine
Professor Emeritus
Department of Molecular Genetics
and Informatics
Rockefeller University
Founder, Department of Medical
Genetics
University of Wisconsin, Madison

**David H. Marlowe, PhD
(1931-2014)**
Senior Lecturer
Department of Psychiatry
Uniformed Services University
Former Chief
Department of Military Psychiatry
Walter Reed Army Institute of
Research
Fellow
American Anthropological
Association

STAFF

Deborah Probe Adams
Pablo Aliaga
Eva Asabre
Jared Axelowitz
Danielle Bartolanzo
Sara Bessman
Catherine Broshek
Alexandra Burris
Paula Burris
Jessica Canales
Madeline Crissman
Sarah Cupples
Victoria DeHoyos
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Stanley Ng
Julia Petrini
Ashley Phares
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Michelle Rusk

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Tung Tu
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Anjali Whalen
Holly Wu
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Funded Grants

| AWARDS (Jan-Dec 2019) | FUNDING INSTITUTION |
|---|--------------------------|
| Evaluation of the Safety and Pharmacokinetics of the FAAH Inhibitor URB597 | USAMRMC |
| Brain Bank Project: Consortium for the Translational Neuroscience and Treatment of Stress and PTSD (VA Biorepository Brain Bank: PTSD Brain Bank Protocol) | VA |
| Study to Assess Risk and Resilience in Servicemembers — Longitudinal Study (STARRS-LS) | DHP |
| Continuation of the Army Study to Asses Risk and Resilience in Servicemembers (Army STARRS) | DHP |
| Family Violence and Trauma Project | IMCOM |
| GREAT-SF (Grief-Focused Resilience Activities and Training for Surviving Families): An Online Selective Intervention for Bereaved Military Families | CDMRP |
| Military-Related Risk for Child Neglect in DoD Families: A Population Study to Inform Future DoD Child Neglect Prevention Efforts | MCFP |
| Enhancing Fear Extinction via Angiotensin Type 1 Receptor Inhibition: A Randomized Controlled Trial in Posttraumatic Stress Disorder | UCSD |
| Examination of the Short and Long-term Impact of School Shootings | UCLA |
| Pilot Trial of Nightmare Deconstruction and Reprocessing, a Novel Treatment for PTSD-Related Nightmares and Insomnia | USAMRMC |
| Continuation Pilot Trial of Nightmare Deconstruction and Reprocessing, a Novel Treatment for PTSD-Related Nightmares and Insomnia | USAMRMC |
| Identifying Predictors of Treatment Response in Service-members with Posttraumatic Stress Disorder Related Sleep Disturbances: Use of Large Datasets to Improve Treatment Selection over the Military Lifecycle | USAMRMC |
| Support for Voices of September 11th — Public Safety Canada | Voices of September 11th |
| Center for the Study of Traumatic Stress (CSTS) Program | DHP |
| Coping Strategies Used by Survivors of Suicide Loss | AFSP |
| Personalized Medicine Approach to Light Treatment for Increasing Alertness and Performance in Operational Settings | ONR Global |

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5-Eyes Mental Health Research Consortium
Alfred P. Sloan Foundation
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American Gold Star Mothers
American Psychiatric Association
American Psychological Association
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Armed Forces Retirement Home
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Assistant Secretary for Preparedness and Response
Association for Death Education and Counseling
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California Mental Health Services Authority
The Carter Center
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Canadian Forces Health Services
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Catholic University of America
Center for Forensic Behavioral Sciences
Center for Health Disparities Research, Medical University of South Carolina
Centers for Disease Control and Prevention
Collaborative Health Initiative Research Program
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Columbia University Center for Complicated Grief
Connecticut Department of Mental Health and Addiction Services
Cornell University
Dartmouth University
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Defense Health Agency
Department of Mental Health, District of Columbia
Deployment Health Clinical Center
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Drexel University
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George Washington University, School of Medicine and Health Sciences
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Harvard University School of Public Health
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Honoring Our Fallen
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U.S. Army Medical Research and Materiel Command
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Voices of September 11th
Walter Reed Army Institute of Research
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West Virginia University
Western New York Psychiatric Society
Wright State University
Yale University
Yellow Ribbon Reintegration Program
Zero to Three

Snapshots of CSTS



Dr. Ursano receiving an award from the Association of Military Surgeons of the United States.



Dr. West at his retirement ceremony.



Drs. West, Benedek, and Ursano.



Dr. Benedek talking to CSTS staff during USU tour.



CSTS staff visit to the Warrior Canine Connection.



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Uniformed
Services
University

Center for the Study of Traumatic Stress
Department of Psychiatry
Uniformed Services University
4301 Jones Bridge Road, Bethesda, MD 20814-4799
www.CSTSONline.org