CHAMP

Uniformed Services University

2017 ANNUAL REPORT

LEADING THE WAY IN **HUMAN PERFORMANCE OPTIMIZATION**

CONSORTIUM FOR HEALTH AND MILITARY PERFORMANCE

2017 ANNUAL REPORT

LEADERSHIP

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USU Uniformed Services University | CHAMP Consortium for Health and Military Performance

Uniformed Services University Of The Health Sciences
Department Of Military And Emergency Medicine
Consortium For Health And Military Performance
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1 December 2017

Dear Stakeholders:

The 2017 Annual Report for the Consortium for Health and Military Performance (CHAMP) presents an overview of our accomplishments, which are diverse and in line with our mission of readiness. CHAMP continues to provide Service Members, their families, providers, and commanders with expert, integrated, holistic, evidence-based information and advice on many aspects of health and performance and to be consistent with the Total Force Fitness (TFF) and Human Performance Optimization (HPO) frameworks. Along with our ongoing programs, CHAMP pursued many projects in response to requests from the Department of Defense, all four Services, and other military sources.

In 2017 CHAMP revised its strategic framework and strategy map. Our key strategic pillars are Education and Training, Leadership and Service, and Research and Scholarship; our strategy map is provided in the report following. Based on these pillars we have developed strategic objectives and sustained a wide range of HPO and TFF activities relevant to those objectives. We developed resources for Service Members and their families, commanders, and providers and also initiated several research projects to address important unanswered questions related to HPO and TFF. Selected highlights of 2017 included:

- Hosting an Operational and Tactical HPO Workshop for Senior Enlisted and tactical operators to develop community-centric HPO and TFF definitions and frameworks.
- Hosting an Exertion-Related Injury Workshop to develop a DoD clinical network for exertion-related events.
- Development and Approval of Clinical Practice Guidelines for Exertional Rhabdomyolysis.
- Final development of DoD videos for Exertion-related Heat Illness and SCT events in collaboration with the Navy Bureau of Medicine.
- Leading the DoD Go for Green® effort to improve delivery of healthy foods in dining facilities.
- Leading the development of spiritual performance metrics and programs
- Providing subject-matter expertise and teaching in multiple DoD organizations, including National Defense University, Marine Corps University, and Defense Threat Reduction Agency, to name only a few.
- Launch of the new Operation Supplement Safety (OPSS) website and major revision of the Human Performance Resource Center (HPRC) website.

We are proud of CHAMP's contributions to the health, performance, and mission readiness of our Service Members and their families, and we look forward to serving the nation in 2018.

Patricia A. Deuster

Patricia A. Deuster, PhD, MPH
Director, Consortium for Health and Military Performance

CONTENTS

MISSION AND VISION

The Consortium for Health and Military Performance (CHAMP), located within the Department of Military and Emergency Medicine, is the Total Force Fitness arm of the Uniformed Services University of the Health Sciences (USU).

CHAMP optimizes Warfighter mission and family readiness through leadership, community engagement, education, and translation of human performance research. Through the USU framework, CHAMP emerges as a premier leader in the Department of Defense (DoD) as the translational resource in the complete range of disciplines associated with military-unique Human Performance Optimization (HPO) and Total Force Fitness (TFF) for maximizing Warfighter readiness and performance and for optimizing the resilience of the global military family.

As CHAMP continues to evolve, it will become an asset for the entire U.S. national security community.

I. BACKGROUND AND ENVIRONMENT

In December 2009, a CHAMP workshop on Total Fitness for the 21st Century, held at the request of then Chairman of the Joint Chiefs of Staff, ADM Michael Mullen, developed the framework of Total Force Fitness (TFF), which shifted the human performance optimization (HPO) paradigm to take a holistic view of Service Members, their families, their units, and communities—and, by extension, created a new way for DoD to approach its human-resource commitments. On 1 September 2011, TFF was incorporated into CJCSI 3405.01 (Chairman's Total Force Fitness Framework), and one of CHAMP's main missions became providing the best evidence-based, holistic support for Service Members and their families, units, leaders, and communities. This critical need is an ongoing concern for DoD.

In November 2012, the Military Health System (MHS) Defense Center of Excellence (DCoE) Oversight Committee designated CHAMP as a DCoE, reinforcing our status as an integrated part of military medical education and research and a recognized subject-matter expert on HPO, TFF, and other mission-readiness concerns. CHAMP provides leadership, subject-matter expertise, services, community support, and educational products to optimize individual, unit, and family readiness; human performance; and mission readiness across four main areas. We take pride in our:

- Reputable original research and education programs and subject-matter expertise
- Holistic view of complex factors
- Practical wisdom and community approach to shaping future generations
- Unified HPO and TFF expertise

CHAMP translates results, opinions, and materials generated by others into practical and applicable products. We collaborate with DoD and other Federal agencies (see Appendix I) particularly in the areas of TFF, HPO, and mission readiness. CHAMP's holistic approach strives to address individual and community issues by integrating impressions and data from various sources and areas of expertise. As an integrated component of the Uniformed Services University (USU) health-science programs, CHAMP can shift the mindset of those actively engaged in caring for Service Members across all Services. We contribute to USU curricula in medicine, nursing, dentistry, behavioral sciences, and preventive medicine/public health.

We serve as a unifying force across all Services on issues related to HPO science and translation and have shown ourselves to be a trusted and dependable source of HPO and TFF solutions. We contribute to the promotion of joint and inter-/intra-Service collaborative research and promulgate evidence-based HPO practice recommendations based on military service requirements.

II. STRATEGIC MAP: INTEGRATING MEANS, WAYS, AND ENDS

In 2017 CHAMP, as an integrated part of USU, revised and aligned our strategic framework and map to USU's five-year strategic plan. Figure 1 presents this new map with our strategic objectives, focus areas, and Means, Ways, and Ends. Our initiatives help strengthen, integrate, and streamline Defense Health Affairs (DHA) efforts to provide effective care for Service Members and their dependents; enrich its Service-related policies, programs, and other endeavors; and optimize programs that address issues to maximize mission readiness.

<table>
<tr><th colspan="4">READINESS</th></tr>
<tr><th></th><th>EDUCATION & TRAINING</th><th>RESEARCH & SCHOLARSHIP</th><th>LEADERSHIP & SERVICE</th></tr>
<tr><td>ENDS</td><td>CHAMP contributes to mission readiness in the field of HPO and TFF by educating and training the DoD workforce, their families, and others (E1)</td><td>CHAMP R&S addresses emerging HPO/TFF gaps through innovation and implementation (E2)</td><td>CHAMP is sought after to provide HPO/TFF support throughout DoD, across the U.S. Government, and globally (E3)</td></tr>
<tr><td rowspan="5">WAYS</td><td rowspan="2">Expand to be a global resource for HPO and TFF education (W1)</td><td>Align CHAMP's research portfolio with identified HPO/TFF gaps and priorities across DoD (W4)</td><td rowspan="3">Expand HPO/TFF support to improve mission readiness (W5)</td></tr>
<tr><td>Demonstrate effectiveness of HPO and health knowledge products to unit readiness, training, and operations (W7)</td></tr>
<tr><td rowspan="2">Promote culturally relevant HPO/TFF curricula to maximize customer/ stakeholder trust and engagement (W2)</td><td>Expand outreach to operational communities (W8)</td></tr>
<tr><td>Develop strategic partnerships with service-specific HPO focal points across DoD, federal entities, and public and private organizations (W9)</td><td rowspan="3">Improve return to duty outcomes through preventive and clinical consultative services (W6)</td></tr>
<tr><td rowspan="2">Expand the use of cutting-edge educational methodology and technology for HPO knowledge product dissemination (W3)</td><td>Improve strategic communications (W10)</td></tr>
<tr><td>Improve effectiveness of internal processes (W11)</td></tr>
<tr><td rowspan="3">MEANS</td><td colspan="3">Recruit, retain, and create effective educators/scientists/roles models/leaders (M1)</td></tr>
<tr><td colspan="3">Strategically grow and allocate physical and IT infrastructure (M2)</td></tr>
<tr><td colspan="3">Strategically grow and allocate financial resources (M3)</td></tr>
<tr><td colspan="4">CHAMP Values: Integrity | Innovation | Compassion, Caring, and Mutual Respect | Communication | Excellence in Scholarship | Collaboration, Teamwork, and Diversity | Selfless Service</td></tr>
</table>

Figure 1. CHAMP's Strategic Map

III. MAJOR ACCOMPLISHMENTS IN 2017

Each of CHAMP's projects is based in one of its three focus areas: education and training, leadership and service, and research and scholarship. However, to ensure a holistic, integrated approach—as well as strong, clear focus on specific issues of interest to the Services and DoD—CHAMP's subject-matter experts and support staff typically contribute to efforts in all three areas, carrying their expertise, ideas, and questions across the full spectrum of their engagement.

EDUCATION & TRAINING

CHAMP's strategic objective for this focus area is to contribute to mission readiness in the fields of HPO and TFF by educating and training the DoD workforce, their families, and others. Our diverse educational activities include teaching in the USU School of Medicine and Graduate School of Nursing, training residents and sports medicine fellows, and

the Marine Corps Force Fitness Instructor's course, through webinars in support of the services and information on our websites. We strive to serve individual Warfighters and their commanders, families, and healthcare providers as well as MHS and DoD. Information on selected activities other than teaching within USU is provided below

CHAMP's two websites—the Human Performance Research Center (HPRC) and Operation Supplement Safety (OPSS)—both maintain a strong social-media presence through dedicated Facebook, YouTube, and Twitter accounts. HPRC and OPSS had a strong year in 2017, despite substantial revisions and the creation of an independent website for OPSS. Although overall usage showed the anticipated decline in web page usage because of the revisions, social media numbers increased substantially. Below are highlights of HPRC and OPSS activities in 2017.

In addition to science-based information for HPRC and OPSS, CHAMP provides website content, primarily pieces that address emerging and seasonal topics, across all domains for the ArmyFit and SOCOM/POTFF websites. In 2017, CHAMP subject-matter experts provided 84 articles and 37 FAQs, with illustrations, and answered user questions submitted via an Ask-the-Expert portal on the ArmyFit website.

Human Performance Research Center

HPRC-ONLINE.ORG

HPRC provides extensive, up-to-date, accurate information on evidence-based strategies to optimize individual performance, pain management, nutritional guidance, family and relationship advice, mental fitness, environmental considerations in fitness and exercise, and other areas of interest and value to Service Members and their families. New projects in 2017 included:

- Launching a #GotMySix campaign in September 2017 as part of Suicide Prevention Month, which focused on having people identify someone who "got my six" or someone you know is looking out for your well-being by using the hashtag "#GotMySix" on social-media platforms such as Twitter and Facebook. This campaign provided a venue to strengthen participants' personal bonds through public recognition of those who support them in any aspect of Total Force Fitness.
- Providing Mental Toughness workshops, webinars, and educational content for organizations such as the Defense Threat Reduction Agency (DTRA), Pentagon Fit-to-Win Running Program, Advanced Medical Department Officer Course (AMDOC), and Army Public Health Command Behavioral Health series.
- Beginning a Family and Relationships monthly feature addressing military-specific issues raised by current events; results from recent military-relevant studies; and techniques and resources for handling recurrent life challenges.
- Making Rehab, Refit, Return to Duty (Rx3) available to MHS providers directly from the Tri-Service Workflow Alternate Input Method Core Form Electronic Medical Record (EMR). The popularity of the Rx3 program for Service Members exploded in 2017 based on a doubling of traffic to the web pages.
- Providing substantive revisions to and developing training for Go for Green® (G4G), the joint-Service performance-nutrition initiative to improve the food environment for Service Members (https://www.hprc-online.org/page/go-for-green).
- Updating the Combat Rations Database (ComRaD; hosted on HPRC's website at https://www.hprc-online.org/ComRaD), which was developed in partnership with the U.S. Army Research Institute of Environmental Medicine (USARIEM) and Combat Feeding Directorate to enable Service Members, dietitians, food-service officers, and leaders to access up-to-date nutritional information on individual combat ration menus and their component foods. In 2017 a ComRaD mobile application also was developed.

Operation Supplement Safety (OPSS)

OPSS.ORG

OPSS provides scientifically sound, current information on dietary supplements of interest to healthcare providers, commanders, Service Members, and military families. It provides information about substances prohibited by DoD and supplements that should be considered "high risk," including a list of commercial products containing risky or prohibited substances. New projects in 2017 included:

- Launching the independent OPSS website.
- Launching an OPSS newsletter. Users sign up from the main page of the OPSS website to get up-to-date information about our newest educational materials and other pertinent information from our federal partners.
- Updating and adding new informational products to the website, including articles and FAQs about "go pills," new information on ingredients of concern, and patient history of dietary supplement use; infographics featuring caffeine, SARMs, and reporting of adverse events.
- Partnering with the Defense Commissary Agency to prevent dietary supplements with illegal ingredients being sold in their stores.
- Updating our DMAA, SARMs, stimulants, and DoD-prohibited ingredients lists.
- New and improved OPSS High-Risk Supplements List, in conjunction with the U.S. Anti-Doping Agency (USADA).
- Working with our Federal partners to issue a warning letter about SARMs.
- Publishing two papers that identified dietary ingredients that should not be in supplements:

experimental stimulants and SARMs (see Appendix 2, references 6 and 28):

- Receiving special requests from the field regarding adverse events and potentially problematic products, and working with service dietitians to distribute all pertinent information.

Ask the Expert

Each of CHAMP's web-based programs—the Human Performance Resource Center (HPRC) and Operation Supplement Safety (OPSS)—has Ask the Expert buttons prominently placed on their websites. This ATE function is staffed by CHAMP's cadre of nutritionists, exercise physiologists, physicians, psychologists, and other subject-matter experts. Healthcare providers, military commanders, Service Members, their spouses, and even their teenage children have submitted questions through our ATE portals to get reliable, up-to-date, multifaceted answers. Each ATE question receives a prompt, personal, detailed response. In 2017 a total of 833 ATEs were received, and although most were about dietary supplements (~75%, or 633), questions about G4G increased markedly from 2016 to 2017. Army (active-duty and reserve) Members submit the most ATEs, followed by Air Force, Coast Guard, Navy, and then USMC. Approximately 19% of ATE questions came from military providers and the rest from Service Members. We are proud of this service, as we know it helps all who reach out to us.

Examples of questions are provided in Table 1 and unsolicited and solicited feedback in Table 2. In addition to ATE questions, we received many requests for handouts, posters, and PowerPoint presentations related to dietary supplements, HPO, and TFF.

TABLE 1. EXAMPLES OF ATES IN 2017 ACROSS HPRC AND OPSS

NUTRITION	"My question is for proper dieting and nutrition information. What's the best way to lose weight for a 53 year soldier?"
SPORTS MEDICINE/RX3	"I am interested in some exercises for my elbow pain, or lateral epicandylitis. Please advise."
GO FOR GREEN®	"Where can we find or get the GFG 2.0 training at our installation. I run the NCD including the dining facility at West Points Keller Army Community Hospital and we desperately need an update to our GFG program and menu."
DIETARY SUPPLEMENTS	"All, where is there a link or site I can go to find the latest legal ingredients/ products that won't pop positive for a drug test in the air force, and if this is the site, where exactly to go? Also, is it safe to take if it's one name off? Like taking DMAE instead of DMAA?"
	"I was wondering if the bucked up pre-workout and deer antler spray from das labs really does contain IGF1 and is it prohibited use in the US Marines."
FAMILY	"I am a Military Family Life Counselor currently embedded with 802nd Security Forces at Lackland AFB. I am initiating planning and implementation of the TFF: Military Family Fitness Model within the squadron. Do you have access to models which have already been implemented and are working? Examples of the model in action could possibly reduce time and improve efficiency in implementing the model, especially for a group of 600+ service members, plus family."

TABLE 2. SOLICITED AND UNSOLICITED FEEDBACK FROM INDIVIDUALS WHO SUBMITTED AND RECEIVED RESPONSES TO THEIR ATES

"Phenomenal support! I can't thank your team enough."
"Very quick response time and helpful information. Thank you!!"
"The info I received helped me make a very sound decision on the supplements I have chosen to take."
"I shared your response with other AF RDN's and they were also pleased. Thank you!"
"I forwarded this website to our Soldiers and Airmen in Utah, great site."
"Thanks for taking the time to help me better understand the supplements I'm interested in taking."
"Thanks for the rapid response as well as the additional information that was tied to the nutrition question asked."
"Definitely not going to take it (Test Stack No. 17). Thank you."
"This is perfect. Thank you for the detailed response and attached links."
"Thank you so much. I did not open my box (M1D Andro, Epiandro 50, and Form-XT) and returned for a refund."
"I really appreciate the thorough feedback. That was awesome!"

Marine Corps Force Fitness Instructor Training

The Marine Corps now offers two six-week courses: the Force Fitness Instructor (FFI) and Force Fitness Instructor Trainer (FFIT) courses. CHAMP not only helped develop the curriculum but also taught regularly in the nutrition module on dietary guidelines and dietary supplements—both didactic and practical activities.

LEADERSHIP & SERVICE

CHAMP's strategic objective for this focus area is to be sought after to provide HPO/TFF support throughout DoD, across the U.S. government, and globally. In 2017 CHAMP was often called upon to lend expertise and support to explore strategies and priorities that build HPO/TFF capabilities and capacities within the Department of Defense. CHAMP contributions seek to improve outcomes by leveraging a wide range of evidence-based studies to translate, create, and disseminate valuable HPO/TFF tools and resources.

In 2017, we initiated a more deliberate push to engage our partners by promoting efforts "left of bang"—i.e., helping them develop and enhance prevention and performance strategies along with the more traditional goals of effective treatment and recovery. Those efforts led to new partnerships and stronger bonds with existing partners (see Appendix I) through invitations to address HPO concerns and by capacity-building, community-based practices, strategic initiatives, and direct connections with Warfighter populations and communities. Our activities relating to this focus area ranged from educational and leadership services to community outreach, clinical consultations, and staff development. Table 3 provides a summary of activities, accomplishments, and initiatives. Educational activities are summarized briefly in Table 3, and other topic areas listed are described more fully below.

TABLE 3. A SUMMARY OF NEW ACTIVITIES AND ACCOMPLISHMENTS FOR CHAMP IN 2017 RELEVANT TO OUR LEADERSHIP AND SERVICE PILLAR.

EDUCATIONAL ACTIVITIES	Navy Advanced Medical Department Officer Course: We provided senior Navy Medicine military and civilian leaders with skills to manage the stress and presented HPO and TFF knowledge resources and tools.
	Navy Executive Medical Department Enlisted Course: We provided an overview of services and products available through CHAMP's programs and websites to Senior Enlisted Leaders.
	Defense Threat Reduction Agency: We provided sessions on health, performance nutrition, performance psychology, stress optimization, and physical fitness for DTRA military and civilian staff.
	National Defense University: We provided brown-bag lunch sessions for faculty and students on a holistic approach to optimizing brain health and function.
	Marine Corps University: We provided lectures to students on HPO and TFF.
LEADERSHIP ACTIVITIES	**Spiritual Performance Program**
	Operational and Tactical HPO Workshop
	Air Force Security Forces Defenders Edge
	U. S. Coast Guard Basic Training Physical Fitness Programming Review
	U.S. Marine Corps G10 Force Preservation Summit and other activities
	U.S. Army's Holistic Health Fitness Workshop
	Building Health Military Communities
	Go for Green®
	CHAMP Staff Development
CLINICAL SERVICES	**Clinical Consultations for Exertion-Related Events**
	Heat Tolerance Testing for return to duty
	Multidisciplinary Conference Panel for Exercise-Related Events
	Exertion-Related Injury Workshop
	Clinical Practice Guidelines for Exertional Rhabdomyolysis
	DoD videos for Exertion-related heat illness and SCT events

STRATEGIC LEADERSHIP ACTIVITIES AND INITIATIVES

A diverse range of worthwhile activities and initiatives reflecting our objective of expanding HPO/TFF support to improve mission readiness took place in 2017. Summaries of the most noteworthy strategic leadership accomplishments are provided below. Importantly we include a synopsis of efforts we have taken to grow our extraordinary CHAMP staff.

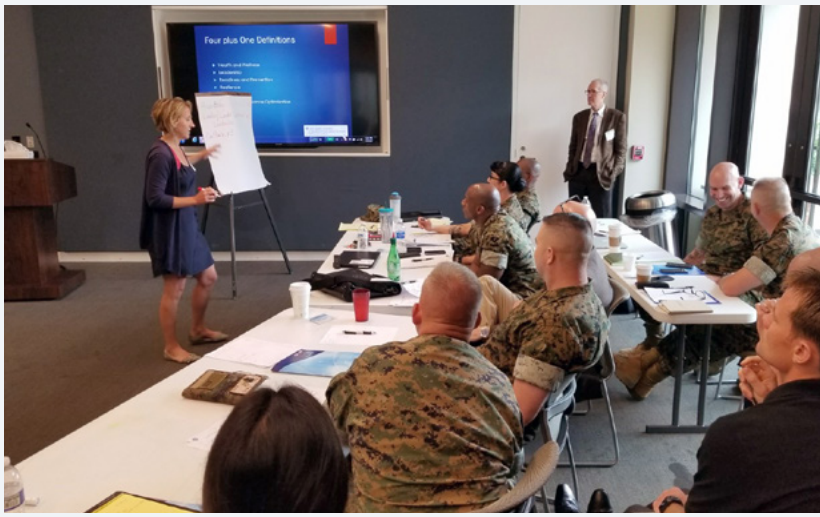
Spiritual Performance Program

CHAMP's Spiritual Performance Program team, new in 2016, continued its great work in 2017. The team created Spiritual Fitness survey questions for a USSOCOM POTFF baseline fitness survey and recommended changes to the definition of "Spiritual Fitness" for the CJCSI 3405.01 Chairman's Total Force Fitness Framework. The team also developed, in collaboration with Fort Belvoir Community Hospital, a spiritual distress screening form to identify patients who would benefit from referral to chaplain services and participated in a quality-improvement program at Malcolm Grow Medical Clinic and Surgery Center to integrate chaplain services into its primary care clinic.

SPOTLIGHT ON
OPERATIONAL AND TACTICAL HPO WORKSHOP

One major objective for CHAMP is to expand our outreach to operational communities, and this past year we began a new effort to work with Warfighter units. To that end, we hosted our first Operational and Tactical HPO/TFF workshop—a "bottom-up/top-down" approach—to synergize human performance enhancement initiatives from Warfighter communities and policymakers.

Approximately 30 participants from selected U.S. Air Force, Marine Corps, and Department of Homeland Security communities, with 11 observers from various DoD organizations responsible for healthcare policy, participated in our Phase I workshop. Over the two days, each community: 1) constructed its own definition of HPO based on the community's mission readiness and lethality; 2) created a TFF framework to highlight unique capabilities and occupational vulnerabilities; and 3) interfaced with policymakers. This workshop yielded a paradigm shift that will allow improved targeting of resources and reduction of overlap and redundancy in training requirements. Phase II efforts in 2018 will focus on helping each community align TFF domains to mission-essential tasks, examine domain-specific capabilities and risk factors, and explore operationally-centered metrics.



U. S. Coast Guard Basic Training Physical Fitness Programming Review

The Injury Prevention Research Laboratory, along with other CHAMP personnel, recently initiated a collaboration with the United States Coast Guard Training Center Cape May. Led by Dr. de la Motte and the CHAMP Injury Prevention Research Laboratory (IPRL)—subject-matter experts in military health, injury prevention, human performance optimization, and nutrition—we aim to provide guidance and recommendations for human performance optimization, decreasing musculoskeletal injury, and increasing success for recruits at United States Coast Guard Recruit Training at Training Center Cape May.

Air Force Security Forces

CHAMP continues to work with the Headquarters Air Force Security Forces Center and their Defender's Edge Team in support of organic HPO and TFF efforts. In 2017 CHAMP assisted with building and refining curricula used to train front-line supervisors and squadron leadership, developed and executed a Memorandum of Understanding, and collaboratively shaped their campaign plan to integrate HPO and TFF concepts into training policy for mission-essential tasks.

United States Marine Corps

In 2017, CHAMP assisted HQ USMC in building a community of HPO and TFF, including a tour with the G-10 to promote HPO and TFF Culture Preservation through briefing at E-8 seminars, an invited lecture at the Command and Staff College on TFF, and start of construction of a TFF framework ("the wall") as an extension to G-10 operations and the realignment of HPO efforts and resources. We also were privileged to participate in the G10 Force Preservation Summit—a great opportunity and Marine Corps effort. Overall, the USMC TFF framework will be a key driving force for USMC HPO efforts in 2018.

Building Health Military Communities (BHMC)

As part of meeting our objective of expanding HPO/TFF support to improve mission readiness (W5), CHAMP continued to collaborate with the Office of the Secretary of Defense and the National Guard Bureau in an effort to promote the health and wellness of National Guard and reserve units in selected states. This year the BHMC team developed a resource guide identifying digital media resources, mobile applications, and websites that is publicly available on the HPRC website (https://www.hprc-online.org/docs/building-healthy-military-communities-bhmc).

Go For Green® (G4G)

In the absence of a fully institutionalized G4G program, CHAMP has served as the G4G program office, provided leadership across all military Services, and represented G4G 2.0 at DoD meetings, policy revisions, and initiatives. We provided leadership in the Air Force Food Services, Army Food Program, and Marine Corps

Fueled to Fight with subject-matter expertise in pilot testing and planning implementation of G4G 2.0. In addition to web-based G4G training modules, CHAMP also provided training sessions in G4G 2.0 via real-time teleconference to more than 300 people, including 125 G4G Program Leads, 123 G4G Coders, and 57 G4G Staff Trainers. CHAMP nutrition education experts also produced and maintained all G4G 2.0 resources for food-service operations/program operation, marketing, and nutrition education for Service Members. CHAMP also led the creation of detailed G4G 2.0 Program Requirements through staffing, adjudication, and final publication so that the Services can now move forward with planning and implementing G4G 2.0 within their own food services and nutritional programs.

Staff Development

CHAMP offers training and education opportunities to support its staff both individually and as an integrated team. We are committed to ensuring that all our staff members hone their skills as long-term leaders in up-to-date, holistic TFF challenges and solutions while optimizing their contributions to our day-to-day efforts to achieve and integrate our strategic goals and objectives.

- Lectures, Workshops, and Practicums: CHAMP staff members are encouraged to attend lectures, workshops, and other didactic activities within USU to build their skillsets and knowledge base.
- Quarterly Training: Staff members participate in staff-led workshops and retreats designed to strengthen team cohesion, improve interpersonal and professional relationships, and enhance abilities to work with a wide variety of communication styles.

- Professional Conferences: CHAMP staff members attended a total of 57 professional events this year, including 30 conferences, 9 symposia, and 18 workshops. Ten were military-specific. In most cases, they presented their work, served on expert panels leading discussions within their areas, or both; however, the opportunity to see others' work, strike up or renew professional relationships, and discuss mutual professional interests are also invaluable to maintain broad, integrated, curious, state-of-the art expertise and inquiry into TFF and HPO issues.
- Individual Professional Training and Education: CHAMP tries to support both long-term graduate education for staff members who seek to improve their professional knowledge and shorter courses and training programs to acquire or sharpen specific skills. In 2017, three staff members completed individual courses in their areas of expertise and an additional three continued their pursuit of masters or doctoral degrees.

SPOTLIGHT ON
Patrick Hyde

Dr. Patrick L. Hyde (MCPO, Retired) joined the Consortium for Health and Military Performance in September 2016 as the Director of Strategy and Engagement, only two months after he retired from active duty and while still pursuing a professional doctorate: Doctor of Business Administration (DBA), specializing in healthcare management. In February 2018, Dr. Hyde graduated from Walden University with his doctoral degree. Dr. Hyde hopes that completing his DBA, along with his military experiences, will provide opportunities to contribute meaningfully to improving the performance, health, and well-being of the military population. For example, the knowledge he acquired through his doctoral study can help develop and promote proven human performance optimization strategies that Service Members and their families can employ to enhance their ability to confront complex social, personal, and professional challenges.

Before joining CHAMP, Dr. Hyde served 28 years in the United States Navy as a Hospital Corpsman. Dr. Hyde's military career included assignments overseas and in the United States. He served on numerous naval ships, afloat training command, at military health facilities, and at a military health sciences academic and research institution and participated in humanitarian assignments.

His focus on population health management and well-being fostered the desire to pursue higher education in the field of health care. In 2006, Dr. Hyde graduated from George Washington University with a BS in Clinical Health Sciences, and he graduated from the University of Maryland University College in 2008 with a Master of Science in Health Administration and in 2009 with a Master of Business Administration. In January 2011, Dr. Hyde was assigned to the Uniformed Services University as the Command Master Chief (CMC) and Senior Enlisted Leader, was an active member of CHAMP's External Advisory Board, and represented the enlisted ranks on the subject of human performance optimization. His decorations include the Defense Superior Service Medal, Bronze Star, Purple Heart, Defense Meritorious Service Medal, and other personal and campaign decorations. In July 2016, Dr. Hyde was inducted into the Order of Military Medical Merit and the United States Army Medical Regiment.

CLINICAL SERVICES

A third major objective within the strategic objective of Leadership and Service is improving return-to-duty outcomes through preventive and clinical consultative services. CHAMP has served as the DoD resource for exertion-related events (ERE) for the past decade and provides comprehensive clinical consultations on complex ERE for all military healthcare providers. ERE—which includes exertional rhabdomyolysis (ER); exertional heat injuries (EHI); and exercise intolerance, syncope, and collapse associated with Sickle Cell Trait (SCT)—are of concern to all Services because of the financial costs of limited duty as well as the potentially life-threatening consequences for Service Members and their families. Those at greatest risk for heat injuries are the youngest and most inexperienced Warfighters. Below are summaries of 2017 accomplishments, activities, and initiatives related to this objective.

Exertional Rhabdomyolysis Clinical Practice Guidelines (CPG)

In 2017, CHAMP subject-matter experts finalized the development of a Clinical Practice Guideline for Exertional Rhabdomyolysis. The Guideline went through the formal MHS process and became an MHS-approved CPG. This CHAMP CPG provides a military-specific standard of care based on rigorous, expert review of published scientific evidence and should provide the needed information for prudent case management, including safe return to duty or medical retirement.

Heat Tolerance Testing (HTT)

CHAMP's HTT protocol is intended to determine risk for exertional heat injury in common military training and operational environments. In 2017 CHAMP became the testing location for Army Special Operations Command, and we tested their Soldiers who had experienced an exertional heat stroke to determine whether they could return to duty. In 2017 CHAMP provided heat tolerance testing for at least 13 Service Members.

Multidisciplinary Conference Panel for ERE

CHAMP coordinated a multidisciplinary clinical conference panel of subject-matter experts to meet monthly and discuss complex and unusual cases of exertion-related injuries. Healthcare providers throughout DoD typically refer patients from all Service components who have suffered exercise-related events that remain unresolved. The panel reviews each patient's case history and relevant test results and then comes up with recommendations for further testing, evaluation, and case management. The panel's recommendations are then communicated to the local providers. Over 20 cases were referred to the panel in 2017.

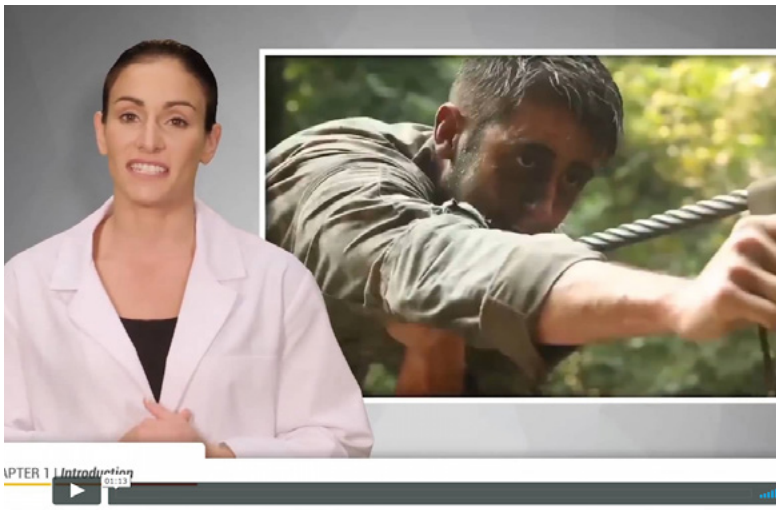
Exertion-Related Injury Workshop

CHAMP hosted an exertion-related injury workshop in 2017. Providers from all Services covering four study sites (Martin Army Hospital, Fort Benning, GA; Womack Army Hospital, Fort Bragg, NC; Wilford Hall Air Force Medical Center, San Antonio, TX; and Base Clinic, Marine Corps Base Quantico, Quantico, VA) came together and formally agreed to participate and begin developing a referral network. The network will be for MHS physician-partners to send Service Members who experience complex exertion-related events to USU and Walter Reed National Military Medical Center for multidisciplinary review and clinical assessment. A template for collecting and examining clinical and research data collected via that network was developed

with the expectation of creating a scoring system to help primary-care providers determine which patients need additional evaluation and treatment for exertion-related events.

Videos for Providers, First Responders, and Service Members

Over the past two years we have worked with the Navy Bureau of Medicine on two videos—one on exertional heat illness for providers and first responders and the second on sickle cell trait—for Service Members, first responders, and providers. These videos were completed in 2017 and are now part of the MHS system. They are also accessible through the CHAMP Vimeo site (Heat Illness – https://vimeo.com/album/4779304; and Sickle Cell Trait – https://vimeo.com/album/4847518) .



RESEARCH & SCHOLARSHIP

CHAMP's strategic research objective is to address emerging HPO/TFF gaps through innovation and implementation. To that end, we typically focus on specific questions within our areas of expertise and those requested by our stakeholders. We also enhance our current educational and clinical activities by pursuing additional scientific evidence and evidence-based development of new services to meet new and emerging needs.

Our research currently falls into four major TFF areas: exertion-related events; musculoskeletal injury prevention; nutrition and dietary supplements; and behavioral and spiritual fitness. Table 4 provides titles of ongoing projects within each topic area with highlights for 2017.

TABLE 4. TITLES OF CURRENT ONGOING RESEARCH STUDIES CATEGORIZED BY MAJOR TOPIC AREAS

EXERTION-RELATED EVENTS	Epidemiology and Genomics of Exertional Related Events in Sickle Cell Trait
	Exertion-Related Injury Study
	Exertional Heat Illness: Biomarkers for Prediction and Return to Duty (HEAT3)
	Biomarkers for Heat Intolerance in Mice
MUSCULOSKELETAL INJURY PREVENTION AND FITNESS	Reducing Injury with Training Enhancement, Targeted Rehabilitation, and Core Conditioning (RITE-TRACC)
	The Military Entrance Processing Screen to Assess Risk of Training (MEPSTART): Predicting and Preventing Musculoskeletal Injury in Basic Training Recruits
	Validation of the CHAMP VO2max Testing Protocol
	Association Between Physical Fitness and Musculoskeletal Injury Risk in Air Force Personnel
	Initiation of Marine Physiological Assessment of Combat Training (IMPACT)
NUTRITION AND DIETARY SUPPLEMENTS	Nutritional Resilience of Soldiers
	Pilot Study of Androgen Use Prevalence in Special Operations Forces
	Performance-Enhancing Supplements (PES) in USSOCOM Forces
	Effects of Vitamin D on Upper Respiratory Tract Infections and Immune Function in Marine Corps Recruits
	Role of the Omega-6:Omega-3 Fatty Acids Ratio in Behavioral Alterations in Mice Fed a High-Fat Diet
	Dietary Supplements: Knowledge and Adverse Event Reporting Practices Among Healthcare Professionals
	Validity, Utility, and Reliability of an Algorithm to Help Select Safe Dietary Supplements
	Impact of Ketones in Low-Carbohydrate and Low-Fat Diets on Cognition and Memory (rats)
	Use of Glyceryltriacetate (GTA) to Reduce Perceived Exertional Fatigue and Improve Athletic Performance
	Effects of Various Dietary Ingredients on Stress Responses of Cells
	Dietary Ingredients in Products on the Market

BEHAVIORAL AND SPIRITUAL FITNESS	**Development and Validation of a Measure of Spiritual Performance**
	Soldier-Medic Mettle Study
	Team Fitness Tracker
	Creating Healthy Effective Forces (CHEF)
	Secondary Analysis of Health-Related Behaviors
	The Green Road

Exertion-Related Events

CHAMP's research focus on exertion-related events (ERE) was very productive this year. As noted above, ERE pose a significant problem in the military, particularly during recruit training, and remain a common cause of preventable non-trauma-related injuries and even death. Some key accomplishments are noted below.

One major accomplishment was another publication on sickle cell trait (SCT) and heat injury (see reference 19 under Appendix 2). We showed that in a setting where universal precautions are utilized to mitigate risk of exertion-related illnesses, SCT is not associated with either mild heat injury or heat stroke.

The Exertion-Related Injury Study (ERIS) began in 2017 and is a three-part Program Project Grant study in collaboration with USU's Departments of Family Medicine and Anesthesiology. Its intent is to develop a referral network for MHS physicians to send Service Members who experience exertion-related events to USU and WRNMMC for multidisciplinary review and clinical assessment. Ultimately biologic markers and risk-stratification algorithms will be identified to assess severity, clinical treatment, and return to duty. As discussed above under Clinical Services, we hosted an ERIS workshop to initiate development of the referral network.

Some very interesting findings emerged from our studies of Biomarkers for Heat Intolerance in mice. We published a paper in the *Journal of Physiology* (reference 30 under Appendix 2) showing that mitochondrial dynamics might protect skeletal muscle against heat stress. Specifically, the results suggested that Drp1-dependent mitochondrial fission might regulate susceptibility to heat-induced apoptosis in muscle cells and that Drp1 may serve as a target for preventing heat-related injury.

Musculoskeletal Injury Prevention and Fitness

Musculoskeletal injuries (MSK-I) incurred during training and deployment remain the leading cause of morbidity and lost duty time. It diminishes combat readiness for both individuals and units and imposes a significant burden on the Military Health System. The year 2017 was a productive one for this topic area. We

published a series of three papers focused on the association between physical fitness and musculoskeletal injury risk—the areas of fitness included cardiorespiratory endurance, muscular strength and endurance, and flexibility, power, speed, balance, and agility (references 8, 9, and 10 under Appendix 2). In addition, several papers were published regarding functional movement evaluations for predicting injury and new models for injury prevention.

- The Military Entrance Processing Screen To Assess Risk of Training (MEPSTART): Predicting and Preventing Musculoskeletal Injury in Basic Training Recruits in 2017 resulted in one presentation at the American Public Health Association Meeting.
- Reducing Injury with Training Enhancement, Targeted Rehabilitation, and Core Conditioning (RITE-TRACC), our project at School of Infantry-West at U.S. Marine Corps Base Camp Pendleton, in 2017 resulted in several oral presentations at the National Athletic Trainers' Association professional meeting and Military Health System Research Symposium.
- CHAMP faculty member Dr. Sarah de la Motte presented "Primary Prevention – Global Prevention for All, and Total Force Fitness" at the 2017 International Congress on Soldiers' Physical Performance.
- Initiation of Marine Physiological Assessment of Combat Training (IMPACT) received IRB approval and began data collection at The Basic School at U.S. Marine Corps Base Quantico in October 2017. This is an exciting study to examine issues related to women in combat.

Nutrition and Dietary Supplements

CHAMP's longstanding expertise in nutritional and dietary supplement issues includes a broad range of research studies regarding the knowledge and consequences of good nutritional habits as well as the risks of unsafe dietary supplements for individual safety and unit readiness. As with our other focus areas, 2017 was an excellent year. We had several major publications from our work specifically in the area of dietary supplements. Two publications showed the presence of illegal and likely dangerous ingredients in products marketed to Service Members (references 6 and 28 in Appendix 2). Another publication was related to our ongoing work to develop a user-friendly algorithm for risk-stratifying supplements. We just completed our study of the algorithm and expect more publications next year. Other notable results related specifically to nutrition research are highlighted below:

- A systematic review assessing the quality of the evidence for plant-based foods and beverages, or their phytochemical constituents, across various outcomes related to cognitive function in healthy adult populations (reference 27 in Appendix 2).
- A methodological publication showing the limitations for self-reporting of dietary patterns and discussing the value of psychometric approaches and standards in addressing these drawbacks for instruments used to estimate dietary habits and nutrient intake (reference 15 in Appendix 2).

- A full supplement in *Nutrition Reviews* linking nutritional science to practice decisions in captive dining settings specifically for military populations (references 5 and 7 in Appendix 2).
- Some very interesting findings emerged regarding the impact of the Omega-6:Omega-3 Fatty Acids Ratio on the microbiome of mice fed high-fat diets. An abstract was presented, and we expect a major publication in 2018.

Behavioral Health and Spiritual Fitness Studies

CHAMP's behavioral health and spiritual fitness efforts strive to identify and develop broadly applicable scientific findings that can be tailored to develop more integrated and better healthcare services that fit the differing needs, motivations, and constitutions of individual Warfighters and their Services. Military commanders, healthcare providers, and individual Service Members and their families can use the resulting information and programs to establish effective preventive self-care and the cultivation of healthy habits. Research highlights are as follows:

- The Soldier-Medic Mettle Study was designed to assess and determine what behavioral health factors might account for allowing some Combat Medics Soldiers not only to cope with the rigors of combat but to also thrive under harsh conditions and upon return to normal daily living. We submitted three papers based on the results and one was published (reference 24 in Appendix 2).
- Team Fitness Tracker, a project in collaboration with TATRC, was designed to help geographically dispersed Service Members maintain their physical activity levels and track activities to maintain readiness, resiliency, and well-being while not in garrison. Recruitment began in the fall of 2017 and will continue through the spring of 2018.
- Secondary Analysis of Health-Related Behaviors examines data from the Health-Related Behaviors Survey (HBS) to identify the dimensions of health behaviors and risks among Service Members, relationships between use of dietary supplements and energy drinks, and key socio-demographic, psychosocial, and health interactions. A few manuscripts are already in preparation; full results are expected to be ready for publication in early FY18.
- **Creating Healthy Effective Forces (CHEF)**—an innovative research study designed to provide participants with holistic knowledge and skills in cooking, nutrition, physical activity, sleep, and mindfulness—was completed. With U.S.O.-Bethesda as host, all 12 participants were either "somewhat satisfied" or "very satisfied" with all but one component of the program. Preliminary analyses showed positive trends in anthropometric

measurements (especially weight) and self-reported behaviors (sleeping, eating, cooking, and mindfulness). Participants typically perceived better well-being and health as well. We expect to publish our findings in 2018.

IV. GOVERNANCE

CHAMP's governance structure is designed to ensure a close, deep connection to the needs of the Services, not just at the policy level but also with the Warfighters and their leaders who are responsible for executing and complying with policy while protecting the nation's interests. In addition to our two internal committees—a leadership and an executive committee, which meet bi-weekly—we have an External Advisory Board (EAB).

The CHAMP EAB consists of senior members of Defense and Service organizations with interests in HPO and TFF, senior enlisted Service Members, and representatives from other federal agencies with expertise in CHAMP's areas of specialization. Members of the EAB are shown in Table 5 below. CHAMP's original EAB charter was approved by the Assistant Secretary of Defense for Health Affairs in July 2015, but it was revised and re-signed after selected revisions in 2017 to include additional members.

TABLE 5. LIST OF CHAMP EXTERNAL ADVISORY BOARD MEMBERS

Director, U.S. Army Public Health Center
Director, U.S. Navy/Marine Corps Public Health Center
Command Surgeon, U.S. Medical Operations Command (or equivalent)
Medical Officer, U.S. Marine Corps
Command Surgeon, U.S. Special Operations Command (USSOCOM)
Commander, U.S. Army Medical Research and Material Command (U.S. AMRMC)
Deputy Assistant Secretary of Defense, Health Readiness Policy and Oversight
Deputy Assistant Secretary of Defense, Health Sciences Policy and Oversight
Senior Enlisted Advisor to the Chairman of the Joint Chiefs of Staff
Senior Enlisted Advisor, Office of the Undersecretary of Defense (Personnel & Readiness)
Senior Enlisted Advisor, Defense Health Agency
Senior Enlisted Advisor, USU
Director, Office of Dietary Supplements, National Institutes of Health, NIH
Director, National Center for Complementary and Integrative Health, NIH
Deputy Commissioner for Foods and Veterinary Medicine, U.S. Food and Drug Administration
Chief, Supplemental Nutrition Assistance Program, Evaluation Branch, U.S. Department of Agriculture
Director, CHAMP

CHAMP's EAB met twice in 2017, at which meetings they provided strategic advice on existing and potential programs and services, methodologies, and approaches for meeting DCoE and CHAMP performance measures. Dr. Thomas W. Travis, MD, MPH, Lieutenant General, USAF, Retired, Senior Vice President, Southern Region, Uniformed Services University, became the Chair of the EAB for CHAMP in 2017, and we are delighted to have him be part of the CHAMP team.

V. APPENDICES

Appendix 1: Partners, Collaborators, and Resources

Indicates an MOU or MOA with the organization

Defense Centers of Excellence

- Defense and Veteran Center for Integrative Pain Management (DVCIPM)
- Defense Centers of Excellence for Psychological Health & Traumatic Brain Injury
- Extremity Trauma and Amputation Center of Excellence
- Hearing Center of Excellence (HCE)
- National Center for Telehealth & Technology
- National Intrepid Center of Excellence (NICoE)
- Vision Center of Excellence (VCE)

Uniformed Services University Departments and Centers

- Center for Deployment Psychology (CDP)
- Center for Rehabilitation Sciences Research (CRSR)
- Center for Neuroscience and Regenerative Medicine (CNRM) Biorepository
- Collaborative Health Initiative Research Program (CHIRP)
- Department of Medicine
- Department of Medical & Clinical Psychology

711th Human Performance Wing

Advanced Medical Department Officers Course

All Army Sports* MOA in progress

Armed Forces Health Surveillance Center (AFHSC)

Armor Down

Biotechnology High Performance Computing Software Applications Institute (BHSAI)

Children's National Medical Center [CNMC]

Combat Feeding Directorate

Comprehensive Soldier and Family Fitness (CSF)

DCOE's Afterdeployment.com

Defense Commissary Agency Headquarters (DeCA)

Defense Health Agency (health.mil, TRICARE)

Defense Media Activity (DoDLive blog)

Defense Threat Reduction Agency (DTRA)

District of Columbia National Guard

Duke University Medical Center

Fleet Family Service Center, Bethesda

Fort Bliss, WBAMC, Nutrition Department

Fort Bliss, WBAMC, Pathology Department

Fort Belvoir Community Hospital (FBCH)

George Mason University (in process)

Headquarters Marine Corps

Joint Centers of Culinary Excellence (JCCoE)

Lackland Air Force Base

Medical Education and Training Command (METC)

Military OneSource

Montgomery County (Maryland) High Schools

National Heart Lung and Blood Institute (NHLBI)

National Institutes of Health Clinical Center, Pain & Palliative Care Service

National Military Family Association (NMFA)

Naval Medical Research Center (NMRC)

Navy and Marine Corps Public Health Center (NMCPHC)

Office of the Secretary of Defense (Logistics and Strategic Communication)

Office of the Surgeon General (OTSG) Army

USA OTSG Performance Triad

Office of the Surgeon General (OTSG) Air Force

Air Force Medical Support Agency Health Promotion Office

Office of the Surgeon General (OTSG) Navy

Office of the Undersecretary of Defense (P&R), Executive Director Force Resiliency (EDFR)

OmegaQuant

Real Warriors Campaign

Substance Abuse and Mental Health Services Administration (SAMHSA)

Stanford University School of Medicine

Telemedicine and Advanced Technology Research Center

The Institute for Integrative Health (TIIH)

Thought Leadership and Innovation Foundation (TILF)

Tufts University

U.S. Army Installation Management Command's Soldier & Community Recreation

U.S. Army Medical Research and Material Command (MRMC)

U.S. Army National Guard (Guard Your Health)

U.S. Army Public Health Center (APHC)*

U.S. Army Research Institute of Environmental Medicine (U.S. ARIEM)*

U.S. Army Research Laboratory (ARL)

U.S. Army Resiliency Directorate (Ready & Resilient)*

U.S. Air Force Security Forces (in process)

U.S. Army Training and Doctrine Command (TRADOC)

U.S. Coast Guard (USCG)*

U.S. Coast Guard Training Center, Cape May

U.S. Customs and Border Protection (Department of Homeland Security)

U.S. Marine Corps Martial Arts Center of Excellence (MACE)

U.S. Marine Corps Recruit Depot, Parris Island

U.S. Marine Corps School of Instruction West, Camp Pendleton

U.S. Military Entrance Processing Command (MEPCOM)

U.S. National Guard, Air Guard, & Reserve Units, Maryland and Florida

U.S. Naval Supply Systems Command (NAVSUP)

U.S. Navy Medicine Enlisted Medical Executive Course

U.S. Navy Office of Community Outreach

U.S. Special Operations Command - Naval Special Warfare Command (NAVSPECWAR)

U.S. Army Special Operations Command (USASOC)

U.S. Special Operations Command - Preservation of the Force and Family Program Office*

United Service Organizations, DC Metro Area

University of Arizona College of Medicine/Arizona Center for Integrative Medicine

University of Connecticut, Korey Stringer Institute

University of Lisbon (Portugal)

University of Maryland (College Park) School of Public Health, Couple and Family Therapy Program

University of North Texas

Veterans Administration Mental Health & Chaplaincy

Veterans Administration Mid-Atlantic Mental Illness Research Education Clinical Centers of Excellence

Vibrent Health

Walter Reed Army Institute of Research (WRAIR)

Walter Reed National Military Medical Center (WRNMMC) – including the Adult Outpatient Behavioral Health (AOBH), Occupational Therapy (OT), and Warrior Transition Brigade (WTB)

Warrior Canine Connection

Warrior Care Policy

WRNMMC, Department of Occupational Therapy

Appendix 2: 2017 Publications, Presentations, and Teaching Activities

Peer-Reviewed Publications

1. Abraham PA, Attipoe S, Kazman JB, Zeno SA, Poth M, Deuster PA. Role of plasma adiponectin /C-reactive protein ratio in obesity and type 2 diabetes among African Americans. Afr Health Sci. 2017;17(1):99-107.
2. Almeida-Suhett CP, Graham A, Chen Y, Deuster P. Behavioral changes in male mice fed a high-fat diet are associated with IL-1beta expression in specific brain regions. Physiol Behav. 2017;169:130-140.
3. Almeida-Suhett CP, Scott JM, Graham A, Chen Y, Deuster PA. Control diet in a high-fat diet study in mice: Regular chow and purified low-fat diet have similar effects on phenotypic, metabolic, and behavioral outcomes. Nutr Neurosci. 2017:1-10.
4. Attipoe S, Manganello C, Scott JM, Deuster PA. Usefulness of a Risk Assessment Tool to Risk Stratify Dietary Supplements. Mil Med. 2017;182(11):e2086-e2091.
5. Berry K, Deuster PA. Foreword: linking nutritional science to practice decisions in captive dining settings. Nutr Rev. 2017;75(suppl_2):1-5.
6. Cohen PA, Travis JC, Keizers PHJ, Deuster P, Venhuis BJ. Four experimental stimulants found in sports and weight loss supplements: 2-amino-6-methylheptane (octodrine), 1,4-dimethylamylamine (1,4-DMAA), 1,3-dimethylamylamine (1,3-DMAA) and 1,3-dimethylbutylamine (1,3-DMBA). Clin Toxicol (Phila). 2017:1-6.
7. Crawford C, Teo L, Elfenbaum P, Enslein V, Deuster PA, Berry K. Methodological approach to moving nutritional science evidence into practice. Nutr Rev. 2017;75(suppl_2):6-16.
8. de la Motte SJ, Gribbin TC, Deuster PA. Optimizing Musculoskeletal Performance Through Injury Prevention. J Spec Oper Med. 2017;17(4):97-101.
9. de la Motte SJ, Gribbin TC, Lisman P, Murphy K, Deuster PA. Systematic Review of the Association Between Physical Fitness and Musculoskeletal Injury Risk: Part 2-Muscular Endurance and Muscular Strength. J Strength Cond Res. 2017;31(11):3218-3234.
10. de la Motte SJ, Lisman P, Gribbin TC, Murphy K, Deuster PA. A Systematic Review of the Association Between Physical Fitness and Musculoskeletal Injury Risk: Part 3 - Flexibility, Power, Speed, Balance, and Agility. J Strength Cond Res. 2017.
11. Gasier HG, Demchenko IT, Tatro LG, Piantadosi CA. S-nitrosylation of GAD65 is implicated in decreased GAD activity and oxygen-induced seizures. Neurosci Lett. 2017;653:283-287.
12. Gasier HG, Demchenko IT, Tatro LG, Piantadosi CA. S-nitrosylation of GAD65 is implicated in decreased GAD activity and oxygen-induced seizures. Neurosci Lett. 2017;653:283-287.
13. Golenbock S, Kazman JB, Krauss S, Deuster PA. General health status in army personnel: relations with health behaviors and psychosocial variables. Qual Life Res. 2017;26(7):1839-1851.
14. Hosokawa Y, Casa DJ, Rosenberg H, et al. Round Table on Malignant Hyperthermia in Physically Active Populations: Meeting Proceedings. J Athl Train. 2017;52(4):377-383.
15. Kazman JB, Scott JM, Deuster PA. Using item response theory to address vulnerabilities in FFQ. Br J Nutr. 2017;118(5):383-391.

16. Kupchak BR, Kazman JB, Vingren JL, et al. Blood Hemostatic Changes During an Ultraendurance Road Cycling Event in a Hot Environment. Wilderness Environ Med. 2017;28(3):197-206.
17. Lisman PJ, de la Motte SJ, Gribbin TC, Jaffin DP, Murphy K, Deuster PA. A Systematic Review of the Association Between Physical Fitness and Musculoskeletal Injury Risk: Part 1-Cardiorespiratory Endurance. J Strength Cond Res. 2017;31(6):1744-1757.
18. McDermott BP, Anderson SA, Armstrong LE, et al. National Athletic Trainers' Association Position Statement: Fluid Replacement for the Physically Active. J Athl Train. 2017;52(9):877-895.
19. Nelson DA, Deuster PA, O'Connor FG, Kurina LM. Sickle Cell Trait and Heat Injury Among U.S. Army Soldiers. Am J Epidemiol. 2017.
20. O'Connor FG, Deuster PA, Barrett J, Kane SF, Depenbrock P. Letter: Is High-Intensity Functional Training (HIFT)/CrossFit Safe for Military Fitness Training? Mil Med. 2017;182(1):1474-1475.
21. Park GH, Messina LA, Deuster PA. A Shift From Resilience to Human Performance Optimization in Special Operations Training: Advancements in Theory and Practice. J Spec Oper Med. 2017;17(3):109-113.
22. Peck KY, DiStefano LJ, Marshall SW, et al. Effect of a Lower Extremity Preventive Training Program on Physical Performance Scores in Military Recruits. J Strength Cond Res. 2017;31(11):3146-3157.
23. Russell A, Deuster PA. Human Performance Optimization and Precision Performance: The Future of Special Operations Human Performance Efforts. J Spec Oper Med. 2017;17(1):80-89.
24. Russell CA, Gibbons SW, Abraham PA, Howe ER, Deuster P, Russell DW. Narrative approach in understanding the drivers for resilience of military combat medics. J R Army Med Corps. 2017.
25. Scott JM, Deuster PA. Ketones and Human Performance. J Spec Oper Med. 2017;17(2):112-116.
26. Shams-White M, Deuster P. Obesity Prevention in the Military. Curr Obes Rep. 2017;6(2):155-162.
27. Teo L, Crawford C, Snow J, et al. Phytochemicals to optimize cognitive function for military mission-readiness: a systematic review and recommendations for the field. Nutr Rev. 2017;75(suppl_2):49-72.
28. Van Wagoner RM, Eichner A, Bhasin S, Deuster PA, Eichner D. Chemical Composition and Labeling of Substances Marketed as Selective Androgen Receptor Modulators and Sold via the Internet. Jama. 2017;318(20):2004-2010.
29. Whittaker JL, Booysen N, de la Motte S, et al. Predicting sport and occupational lower extremity injury risk through movement quality screening: a systematic review. Br J Sports Med. 2017;51(7):580-585.
30. Yu T, Duester P, Chen Y. Role of dynamin-related protein 1-medicated mitochondrial fission in resistance of mouse C2C12 myoblasts to heat injury. J Physiol. 2016;594(24):7419-7433.

Selected Abstracts (from more than 50)

1. Barrett AS, Johnson ZD, Gribbin TG, de la Motte SJ. Assessing Knowledge, Attitudes, and Beliefs about Lower Extremity Injury during USMC Officer Training. USU Research Day. Bethesda, MD, 17 May 2017
2. Crawford C, Boyd C, Berry K, Forcino D, Deuster P. Can Any Dietary Ingredients Mitigate Chronic Musculoskeletal Pain to

Improve Psychological Health and Quality of Life Outcomes? A Systematic Review and Recommendations for the Military. Military Health System Research Symposium. Kissimmee FL, 27–30 August 2017.

3. Zheng X, Kazman JB, Kao T, Krauss S, Jeffery D, Deuster PA. Dietary supplement use among military personnel: A latent class analysis. American College of Sports Medicine. Denver, CO, 2 June 2017.
4. Krauss S, Kazman JB, Russell D, Deuster PA. Longitudinal effects of deployment, recency of return, and hardiness on behavioral health symptoms in U.S. Army combat medics. Military Health System Research Symposium. Kissimmee FL, August, 27–30 August 2017.
5. Sambuughin N, Ren M, Ognoon M, Capacchione J, Chuang K, Muldoon S, Haigney M, Szpisjak D, O'Connor F, Deuster P. The TRPM4 mutation in a patient with Malignant Hyperthermia Susceptibility and repeated episodes of Exertional Heat Illness. Military Health System Research Symposium. Kissimmee, FL, August 2017.
6. Ognoon M, Michaelson L, Sambuughin N, Muldoon M, Deuster A, Voelkel M, Szpisjak D, O'Connor F, Capacchione J. Comparing Malignant Hyperthermia and Exertional Rhabdomyolysis and Heat Illness: A CHCT and RYR1 Analysis. Malignant Hyperthermia Association of the U.S. meeting. Minneapolis, MN, 23 September 2017.

Presentations

Selected Invited Presentation Topics to Military Leadership (over 100)

G4G Presentations

Dietary Supplements

Mental Kills for Stress Optimization

Injury Prevention

Human Performance Optimization and Total Force Fitness

Selected Presentations to Scientific Communities (over 30)

Performing Positively

The Role of Spiritual and Religious Coping

Mechanisms in Non-opioid Users for Pain Management

The Impact of Religious Orientations on Meaning in Life and Death Attitudes

Dietary Supplements: the Science and Application

Translating Injury Prevention Research into Practice – Expanding on the Traditional Public Health

Genetic study of Exertional Rhabdomyolysis and Exertional Heat Illness

Doing Well and Being Well: At the Crossroads of Resilience and Performance

Selected Keynote Addresses at Scientific Conferences (over 10)

The Revolt – Learning from Injury Prevention Failure in Deploying U.S. Marines

The Reformation: Moving Left of the Boom: Targeting the Entry Level Pipeline for Primary Injury Prevention

Sickle Cell Trait and Exercise-Related Events

Selected USU Lectures and Workshops

Wellness Workshop

Fad Diets

Dietary Supplements

Introduction to Biomechanics

Protein and Creatine

Preventive Nutrition

Exercise and Nutrition

Practical Sports Nutrition

Warfighter Nutrition: Environmental considerations

Pharmacology Supplement Workshop - Herbal and Performance-Enhancing Supplements