

THE MEDICAL JOURNAL

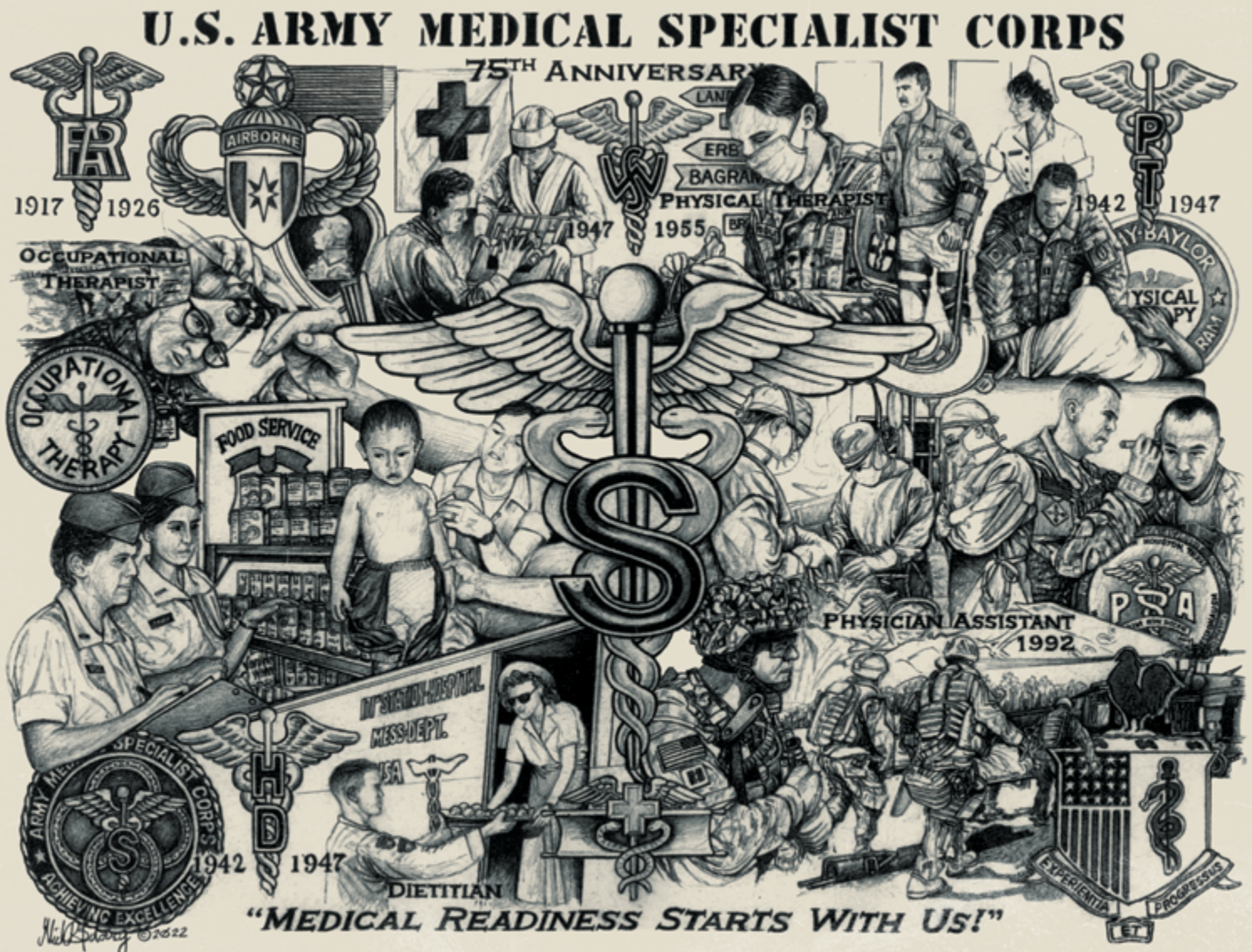
US ARMY MEDICAL CENTER OF EXCELLENCE

Summer

April - June

2024

ARMY MEDICAL SPECIALIST CORPS ANNIVERSARY ISSUE



**UNITED STATES ARMY
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April - June 2024

US Army Medical Center of Excellence

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Note from the TSG

The Army Medical Specialist Corps' 75th anniversary special edition commemorates and highlights the SP Corps, from its inception to its latest milestones—all undeniably related to Soldier readiness. Medical readiness truly does start with our Army Medical Specialist Corps! Its Officers, enlisted counterparts, and civilian partners are a group of tremendously talented professionals who are Ready, Reformed, Reorganized, Responsive, and Relevant to the Army's mission. Because of these professionals, our Service Members can be completely confident as they deploy to fight and decisively win our Nation's wars—because they know Army Medicine has their backs. We will be there, whether in the foxhole or in the fixed facility, Ready to Respond and provide Relevant care to keep them in, and return them to, the fight.

Our Army continues to put People First as it develops and fields a Ready and Modernized force that leans heavily on our Physical Therapists, Occupational Therapists, Dietitians, and Physician Assistants—all of whom care for and serve Soldiers, Family Members, and Soldiers for Life. The Critical Wartime Skillsets these experts bring to the fight are indispensable in today's Army, where Holistic Health and Fitness are crucial components of maintaining our most valuable weapon system—our Warfighters. Whether at home or abroad, our SP Corps teammates lead the advancement of Soldier health and readiness. They are the reason that Army Medicine is Army Strong!

LTG R. Scott Dingle
45th TSG



Note from the Corps Chief

*"We are not makers of history. We are made by history."
—Dr. Martin Luther King Jr.*

As you read through this 75th Anniversary special edition of The Medical Journal, you will notice the breadth and depth of the Army Medical Specialist Corps' skillset and its importance to Soldier readiness. Over the past 75 years, Army Occupational Therapists, Physical Therapists, Dietitians, and Physician Assistants have led the charge on medical readiness across the Army. Our incredible officer, technician, civilian, and contract teammates are uniquely equipped and expertly trained to provide the highest level of medical, physical, and cognitive support to the Warfighter. We continue to provide this support on an expanding basis. This past year alone, we saw the institution of the entry-level Army-Baylor Occupational Therapy Doctoral program, the expansion of the Army-Baylor Doctor of Physical Therapy program, the restructuring of the Graduate Program in Nutrition, and the

most Physician Assistant Direct Accession selections in the past decade. As the Army increases its efforts to optimize Holistic Health and Fitness, Army Senior leaders recognize the value SP Officers bring to the fight and, in 2021, designated all four SP AOCs as Critical Wartime Skillsets.

Those who have come before us have paved the way for a bright future for the SP Corps. It is now up to us to pick up this torch and carry it forward. Our future is indeed bright as we continue to grow our ranks and enhance our health care delivery at the speed of relevance. We will continue to develop leaders of integrity that enhance Soldier health and readiness in garrison and at forward-deployed locations across the globe. This is the decade of the SP Corps! Medical readiness starts with us!

BG Deydre Teyhen
20th SP Corps Chief

The SP Corps Celebrates 75 years

COL (Ret) Stephanie Meyer, with assistance from LTC Kayla Ramotar, LTC Rachel Morgans, and CPT Amelia Weaver

The Army Medical Specialist (SP) Corps celebrated its 75th anniversary on April 16, 2022. Celebrations were limited in early 2022 because of lingering COVID restrictions; however, with limited crowds, celebratory events were held in April. In October 2022, when COVID restrictions were lifted, the Army Medical Specialist Corps Association (AMSCA) sponsored a reception and banquet to culminate anniversary celebrations.

The US Army Medical Department Museum at Joint Base San Antonio–Fort Sam Houston, Texas, held celebratory events on April 21, 2022, where Colonel (P) Deydre Teyhen, 20th SP Corps Chief, provided remarks that focused on the theme of “Remembering the Past, Celebrating the Present and Embracing the Future” of the Corps. Sanders Marble, PhD, senior historian at the US Army Medical Department Center of History and Heritage, provided a living history of the Corps. His remarks were followed by a 75th anniversary video viewing that included comments from the 45th US Army Surgeon General Lieutenant General Raymond S. Dingle, Teyhen, and past Corps chiefs. The event included a “live” display of Army uniforms over the years and culminated with the traditional cake-cutting ceremony. On April 22, 2022, the US Army Medical Center of Excellence held a celebratory event at Blesse Auditorium. The event included a recognition of the Corps’ area of concentration (producing graduate programs) during which officers in SP Corps graduate programs and faculty viewed the anniversary video, followed by a traditional cake-cutting ceremony.

In October 2022, the AMSCA conducted its biennial meeting in San Antonio, Texas, and hosted several 75th

anniversary celebratory events. On October 13, 2022, the AMSCA held a reception at the US Army Medical Department Museum, where SP Corps members past and present were able to celebrate the Corps and the monumental milestone of having its first active component general officer. Many former Corps chiefs were present and were delighted to see Brigadier General Deydre Teyhen’s promotion come to fruition. On the evening of October 15, 2022, the AMSCA held a banquet on San Antonio’s Riverwalk to culminate the 75th anniversary celebrations. Dingle was the keynote speaker, and his remarks echoed the theme of “Remembering the Past, Celebrating the Present and Embracing the Future.” He focused on the SP Corps’ remarkable journey over the years to achieve progressively higher leadership positions. He also highlighted the undeniable central role of the Corps in readiness when he referred to the SP Corps as the “unsung heroes of the AMEDD.” He specifically mentioned the demand from operational commanders to embed occupational therapists, physical therapists, and dietitians in units with Soldiers to optimize readiness—a sentiment that helped bring the Holistic Health and Fitness (H2F) system to fruition. He also lauded physician assistants and the key capabilities they bring to the fight in Role 1 and Role 2 facilities and in combat medic training. Dingle closed by daring us all to lead through change as Army Medicine adapts for future conflicts and to “dare to be our best.” Army Medicine is Army Strong, and in this “Decade of the SP Corps,” there is much to be proud of and much to do to meet tomorrow’s challenges head on—something the SP Corps has been doing for over 75 years!



COL (Ret) Carole Buss and BG Deydre Teyhen.



LTC Joetta Khan, LTC Saleem Khan, LTC Justin Kocher, Mrs. Leah Kocher, and LTC Rachel Morgans.



Graduate Program in Nutrition Class of 2023 students wearing past and present Army uniforms. Center: COL(P) Deydre Teyhen, 20th SP Corps Chief; right: COL (Ret) Jessie Brewer, 10th SP Corps Chief; left: 2LT Dana Robertson. Front row: 2LT Sarah Nowroozian, 2LT Victoria Shapiro, 2LT Dakota Williams, 2LT Jaclyn Travaglini. Back row: 2LT William Hall, 2LT Evan Tryon, 2LT Jane Carnett, 2LT Lynette Mientus, 1LT Laura Thompson, 1LT Aireal Williams, 1LT Gabriel Permann.



Front Row: Current and Former SP Corps Chiefs. COL(P) Deydre Teyhen, 20th; COL (Ret) Jessie Brewer, 10th; COL (Ret) Mary Lucas, 11th; COL (Ret) Bonnie DeMars, 16th; COL (Ret) John Balser, 19th; COL (Ret) Rebecca Hooper, 15th. Second Row: GPN Class of 2023.



COL (Ret) Dexter Hancock, COL (Ret) Bonnie DeMars, COL (Ret) Andrea Crunkhorn, and BG Deydre Teyhen.



MAJ Bryan Pickens and COL Enrique Smith-Forbes.



Current and Former SP Corps Chiefs: COL(P) Deydre Teyhen, 20th; COL (Ret) John Balser, 19th; COL (Ret) Bonnie DeMars, 16th; COL (Ret) Rebecca Hooper, 15th; COL (Ret) Mary Lucas, 11th; COL (Ret) Jessie Brewer, 10th.

Army Medical Specialist Corps 75 Years of History in the Making

COL (Ret) Stephanie Meyer, SP, USA; COL Renee E. Cole, SP USA

INTRODUCTION

On April 16, 2022, the Army Medical Specialist Corps (SP Corps) celebrated 75 years of providing primary and secondary injury and disease prevention, intervention, and rehabilitation services to America's sons and daughters. The SP Corps is comprised of over 1500 active component officers and over 2000 Army Reserve and National Guard officers. SP Corps officers serve in a variety of roles within the Army Medical Department (AMEDD), the Military Health System, across the Army Commands, and deployed throughout the world.

The SP Corps is composed of officers from four distinct medical professions or areas of concentration (AOC): occupational therapists (65A), physical therapists (65B), dietitians (65C), and physician assistants (65D). This article will provide a brief history of the SP Corps' origin, recapping a few details prior to the Corps' existence, and ending in 2022 demonstrating the high demand for SP Corps professionals in support of Soldier health and readiness. A full history of the SP Corps' first 5 years was published in 1993 by Ann M. Ritchie Hartwick and can be found at the Center of Military History.¹ Additional SP Corps history through 1961 can be found on the AMEDD Center of History & Heritage website.²



THE SPECIALIST CORPS' ORIGINS THROUGH THE 1990s

The occupational therapy, physical therapy, and dietitian professions emerged during World War I (WWI). Originally these professionals were women who served the Army Medical Department as Civil Service Commissioned personnel.^{1,2} This distinction meant that they were not “entitled to protective wartime benefits” like commissioned AMEDD personnel. Occupational therapists and physical therapists were called reconstruction aides, their initial qualifications delineated by the Army, whereas dietitian qualifications were defined by the “National Committee on Dietitians Services of the Red Cross”.^{1,2}

After WWI ended, dietitians and reconstruction aides were discharged from service, but the need to support the war’s wounded did not end. Thus the United States’ medical community established professional organizations, founding: the National Society for the Promotion of Occupational Therapy in 1917; the American Dietetic Association, now the Academy of Nutrition and Dietetics, in 1918; and the Women’s Physical Therapy Association in 1921.^{1,2} In 1922, the Medical Department Professional Service Schools at Walter Reed General Hospital implemented post-graduate courses for dietitians and physical therapists, followed by a program for occupational therapists in 1924.^{1,2}

In the years leading up to the United States’ involvement in World War II (WWII), leaders recognized that the numbers of dietitians, occupational therapists, and physical therapists working in the AMEDD and in the United States as a whole were insufficient to meet the anticipated wartime demands. Once again these professionals served as AMEDD civil service personnel. Dietitians and physical therapists “served in every theater of war,” while occupational therapists served in the United States “Zone of the Interior”.^{1,2} In June 1944 the “Bolton Bill” or Public Law 78-350 was passed, providing federal commissions for dietitians, physical therapists, and nurses in the Army, and the same entitlements as other commissioned officers. These newly minted officers were women, and the bill provided “protection under the war clause for women”.^{1,2}

On April 16, 1947 Public Law 80-36 established as part of the Regular Army the Women’s Medical Specialist Corps (WMSC), composed of dietitians, physical therapists, and occupational therapists, and appointed a chief of the Corps with one assistant chief for each specialty.^{1,2} Officers of the WMSC supported the AMEDD war efforts during WWII and the Korean War, but the size of the Corps diminished during peacetime. At the time, Army Regulations would not permit women with dependents under 18 years or qualified men to commission into the Corps.^{1,2} Thus a female officer who wanted to have a family had to leave military service. Recognizing that enlisted men served in WWI, WWII and

the Korean War in the medical specialties, and given the challenges of filling the ranks to support the Korean War, Public Law 84-294 was passed in 1955 permitting male medical specialists to commission, and changed the Corps’ name to the Army Medical Specialist Corps.^{1,2} During the Vietnam War, soldiers assigned to AMEDD fixed medical installations were deployed to South Vietnam with the SP Corps once again lending their skillsets to the fight.¹

After the Vietnam War and during the 1970s, the SP Corps responded to shortages of physicians in the AMEDD by assuming a “physician extender” role. For example, wounded soldiers were permitted direct access to physical therapists for musculoskeletal evaluation and to occupational therapists for hand disorders.^{1,3,4} The late 1970s highlighted an Army focused on physical conditioning and readiness, areas of SP Corps’ expertise including stress management and smoking cessation (65A), supervised exercise programs (65B), and weight control (65C). In 1972, the first SP Corps officer attended Command and General Staff school, a significant event given that SP officers were not offered course seats because they did not hold command or general staff positions. Attendance was contingent on another AMEDD Corps declining the seat (email communication with COL Jessie Brewer, USA Ret., July 30, 2021). The 1970s saw an expanded role for the SP professional within the community and afforded new opportunities for strategic leader development.¹

During the 1980s, the focus on Soldier readiness and fitness further defined the SP officers’ value. Dietitians were assigned to combat divisions to oversee the nutritional needs of line unit Soldiers. Physical therapists and dietitians provided support to Soldiers in fitness centers. Combat stress control was reinstated as a separate functional area of focus for occupational therapists.⁵ A growing number of SP Corps officers were assigned to combat units, participated in field training exercises, and completed training to earn the Expert Field Medical Badge and airborne qualification. New opportunities for SP officers were established at the U.S. Army Research Institute of Environmental Medicine, the Clinical Investigation and Research Service at Walter Reed, in the Office of the Surgeon General (OTSG), at Health Services Command, and at Forces Command.¹ In 1989, the first male Corps Chief, COL Roy Swift, was appointed.¹ The 1980s ended with dramatic changes within the SP professions exemplified by increased diversity, equity, and Army readiness.

During the 1990s, the SP Corps personnel’s skillsets and deployment capabilities continued to grow. During Operation Desert Storm and Operation Desert Shield, active and reserve SP Corps officers and their enlisted counterparts deployed with medical field hospitals and combat stress control units. Their missions included nourishing patients, rehabilitating the injured, providing humanitarian relief, and controlling combat stress.^{6,7} In 1991, a Title 10 United States Code legislative change added physician assistants

to the SP Corps and approximately 300 warrant officer physician assistants were commissioned into the SP Corps on February 4, 1992. Physician assistants' focus on readiness and health was unquestionable, and complimented the SP Corps' readiness-focused skillset. Additionally, the late 1990s recognized the value of the physical therapist to the Ranger community. In 1997, Rangers received direct access to injury prevention and early intervention by physical therapists, yielding a 7% improved readiness outcome—no doubt because of the proven record of direct access to physical therapists and its impact on returning soldiers to duty.⁷⁻⁹ This success resulted in organically embedded physical therapists within special forces and brigade combat teams in 2003, uniquely positioning them in garrison and deployed settings to be the preferred first-line provider for musculoskeletal conditions. By the end of the 1990s, the SP Corps professions solidified their value to the Department of Defense, setting the stage for the 21st century leaps in recognition, growth, and modernization.



LTC (Ret) Anne Andrews (65C) providing security on a ration run. Operation Uphold Democracy, 47th Field Hospital, Haiti, 1995.

THE 2000s AND BEYOND

The SP Corps continued to thrive and, in fact, saw the dawn of new opportunities and many more firsts. On June 26, 2001, COL Brenda Mosley (65A) became the first SP Corps officer chosen from the Colonel-level Centralized Selection List (CSL), a Chief of Staff of the Army command program. She commanded the McDonald Army Community Hospital at Fort Eustis, VA. LTC Martha Davis (65C) was the first SP Corps officer selected for Lieutenant Colonel-level CSL command of the 3rd Medical Recruiting Detachment, serving from 2001 to 2003. Their selections for command led the way for other SP Corps officers to successfully compete

for Colonel- and Lieutenant Colonel-level commands over the ensuing years, paving the way for SP Corps officers to compete for second level AMEDD-specific Senior Nominative Command (SNC). The first SP Corps officer selected for a SNC was COL Theresa Schneider (65B). In 2007, she held a Colonel-level CSL command at the Army Health Clinic in Bavaria, Germany. In 2011, she assumed the SNC at the 62nd Medical Brigade at Fort Lewis, WA, and during her tenure the 62nd Medical Brigade deployed to Afghanistan. The SP Corps now has 20 to 40% of eligible officers annually competing for CSL command and 10 to 20% are selected. See Figure 1 for a sample and visual representation of the progression of SP Corps officers in command.

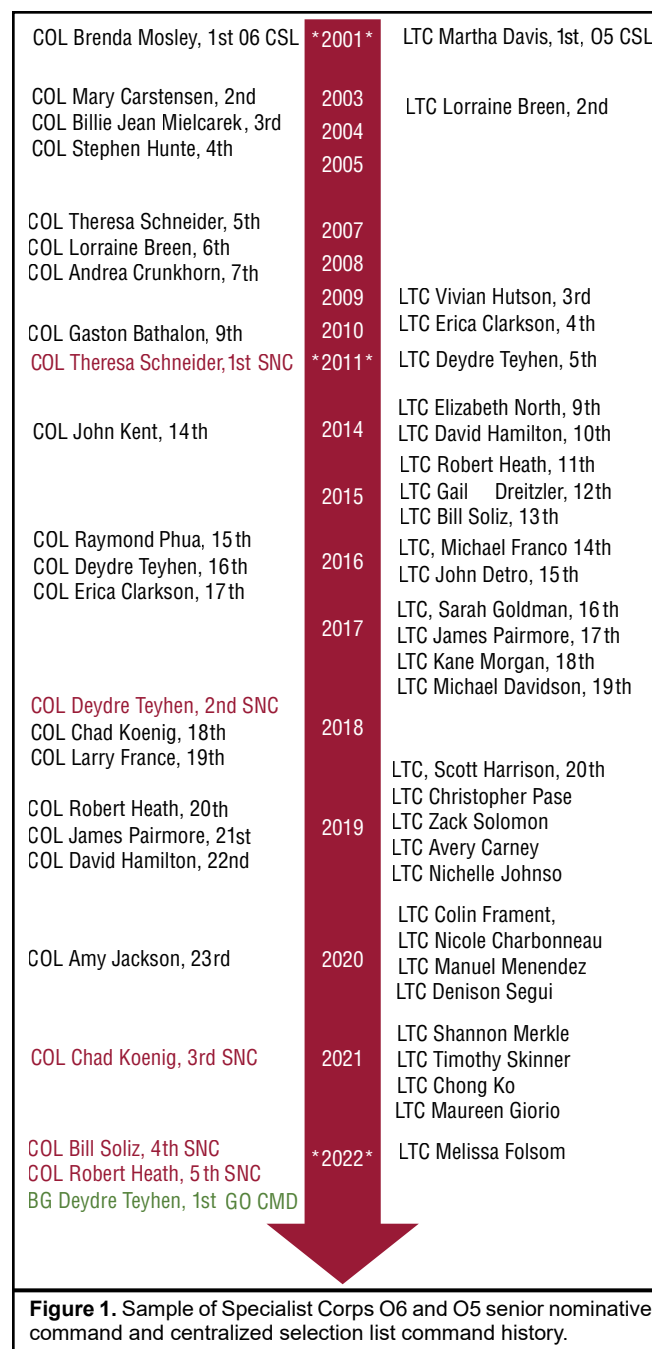


Figure 1. Sample of Specialist Corps O6 and O5 senior nominative command and centralized selection list command history.

In other firsts, COL William Tozier became the first 65D promoted to the rank of Colonel in May 2002.¹⁰ In 2007, COL Vivian Hutson (65C) became the first SP officer assigned as a Deputy Commander for Administration, serving in the role at Munson Army Health Center, Fort Leavenworth, KS. She also served as the first dietitian senior health policy analyst in the Office of the Surgeon General's TRICARE policy division and she was awarded the "Female Trailblazer" award for these and other achievements.¹¹ These amazing officers demonstrated that SP officers can lead at senior levels in the Army and Department of Defense (DoD).

After the terrorist attacks on the United States on September 11, 2001, and during the two decades of missions for Operation Iraqi Freedom and Operation Enduring Freedom (OIF and OEF), many SP Corps officers deployed. After action reports shared with the SP Corps office, published articles, and the US Army Physician Assistant Handbook, Second Edition, portray how each AOC in the SP Corps supported service members, coalition partners, and local nationals in theater and in garrison.¹²⁻¹⁹ A sample of contributions during this time follows and provides insights into just how vast the SP Corps' officer's reach was during these conflicts.

Occupational therapists and occupational therapy assistants provided a range of Combat and Operational Stress Control (COSC), fitness restoration, mild traumatic brain injury care and reconditioning, and upper extremity therapy. Occupational therapists were integral to the COSC teams providing "Restoration Programs" to service members who needed 3 to 5 days of cognitive restoration, 8 hours of nightly sleep, and daily physical activity.²⁰ The COSC occupational therapist assisted service members develop their restorative goals, obtain support needed, and ensured the most expedited return to duty. The COSC 65A assisted service members with strategies to manage stressors related to relationships and anger, mild traumatic brain injury (mTBI), and post-traumatic stress disorder.²¹⁻²⁸ They even teamed with canine soldiers to aid in their work, thanks to America's VetDogs.²⁹⁻³² In their role initiating pilot mTBI programs in theater, the 65As were integral to the development of clinical guidelines and tools that drive TBI care today. They were also invaluable rehabilitation providers to service members managed through the Wounded Warrior Program, providing life skills programs that supported service members regaining quality of life abroad and at home. The demands of war and its human toll brought a new perspective to the value of 65As and occupational therapy technicians.

The capability to rapidly evacuate theater-injured service members to higher levels of health care increased survivability and provided the opportunity for SP officers to become integral members of multi-disciplinary care teams, such as the poly-trauma focused care teams. The DoD stood up three Advanced Rehabilitation Centers (ARCs) overseen by the Extremity Trauma and Amputation Center of



LTC Joseph Kardouni (65B) caring for a local national.



LTC Leigh Anne Lechanski (65B) in a physical therapy field clinic.



LTC Candi Roberts (65B) conducts casualty care skills training.



President George W. Bush, visits the Occupational Therapy Department at Walter Reed Army Medical Center 2005, COL St. Laurent (65A) pictured.

Excellence; the three centers are the Military Advanced Training Center (MATC), Center for the Intrepid (CFI), and the Combat Casualty Care Center. These centers were established to provide comprehensive, multi-disciplinary support for patients with complex trauma and limb loss from all over the world. Army occupational and physical therapists helped design and open the MATC at Walter Reed Army Medical Center and the Center for the Intrepid at Brooke Army Medical Center.^{33,34} These facilities continue to innovate in military medicine with advanced rehabilitation techniques, cutting-edge technology, and research in poly-trauma and amputation care.³⁵ As amputation care experts, MAJ Elizabeth Painter (65B) and MAJ Sarah Mitsch (65A) traveled to Pakistan as part of a Central Command mission to share their knowledge and skills with members of Pakistan's Armed Forces Institute of Rehabilitative Medicine.³⁶ SP officers from all AOCs provide direct care and supported research endeavors in support of amputation care and rehabilitation.³⁷⁻⁴²

In addition to providing direct care to service members, allied partners, and local nationals, physician assistants contributed to the Combined Joint Special Operations Task Force–Afghanistan. They supported capacity-building through medical seminars (MEDSEMs), a multi-day medical training to improve Afghan medical personnel's capability.⁴³ The 65Ds' reputation as line medical officers and their link between combat trauma survivability and combat medic training in front line units was undeniable. In 2001, LTC (Ret) Don Parson and COL John Detro developed and integrated the Committee on Tactical Combat Casualty Care recommendations of Individual First Aid Kit fielding and Tactical Combat Casualty Care (TC3) predeployment trauma training into Army Doctrine, saving countless lives by including Care Under Fire and Tactical Field Care into every Services' basic training curriculums.⁴⁴

SP officers also served in a number of atypical capacities. COL(Ret) Gaston Bathalon (65C) served as the first of three 65C to be the US Central Command Human Protections Administrator (HPA) on the Joint Combat Casualty Research Team; COL(Ret) Leslee Funderburk and COL Renee Cole subsequently followed.⁴⁵ LTC Nicholas Barringer (65C) and MAJ William Conkright (65C) deployed to Afghanistan to examine special operations forces' eating practices. They assessed foods consumed in theater, in dining facilities, and from operational rations, to better inform operational ration development and to better meet operators' nutrition demands.⁴⁶ The US Army Research Institute of Environmental Medicine created authorized positions for at least one of each SP Corps AOC, codifying research as another SP officer skillset.

Unique opportunities for female soldiers arose to support cultural support teams (CST). These were female-led teams supporting the Army's special-operations community whose mission is to "engage a host nation's female and adolescent



MAJ Joshua Radi (65D), orthopedic surgery PA with the 1-182nd FAR performs a laceration repair for a Soldier in Battalion Aid Station of Camp Redleg, UAE during 2016 deployment in support of Operation Spartan Shield / Operation Enduring Freedom.



Left to Right: MAJ William Conkright (65C), LTC Manuel Menendez (65D), and LTC Nicholas Barringer (65C) at Kandahar Airfield, Afghanistan.



LTC (Ret) Christine Edwards (65C) improvising feeding a child during deployment with the 86th Combat Support Hospital in support of Operation Iraqi Freedom, 2002.

population.⁴⁷ MAJ Christina Deehl (65C) deployed twice to Afghanistan as a CST leader after completing the rigorous training required to prepare her for the many scenarios she could face in austere environments. Some SP officers served as public affairs officers in addition to their AOC specific duties, including LTC Joetta Khan (65C) and LTC (Ret) Bethany Deschamps (65C).^{48,49}

Although the first Physician Assistants from the Army, Navy, and Air Force joined the ranks of the White House Medical Unit (WHMU) in 1978, leadership opportunities were realized by an Army PA going beyond the clinical role.⁵⁰ In keeping with the trend of SP officers serving in new roles, in 2013, COL James Jones was selected as the first PA Deputy Director and Chief of Protective Medicine, WHMU. In January of 2014, COL Jones became the first PA appointed by President Obama as the PA to the President and his personal primary care manager.⁵¹ In April 2017, COL Jones became the first military officer in history to receive a lifesaving award from the Secret Service for his efforts while supporting Malia Obama during a trip to Peru in 2016.⁵²

In September 2011, the Chairman of the Joint Chiefs of Staff Instruction 3405.01 was published.⁵³ The Instruction “identified a framework for adopting and implementing Total Force Fitness (TFF),” a program essential to “DoD’s Force Health Protection and the Chairman’s Health of the Force (HoF) priorities.”⁵³ As a result of this publication, Army Medicine developed the Performance Triad, a public health and wellness initiative aimed at improving readiness that focused on sleep, activity, and nutrition as part of the overarching aim of transitioning the health care system to a System for Health.⁵⁴⁻⁵⁶ The Performance Triad campaign, announced by LTG Patricia Horoho on August 8, 2013, was created and implemented with significant involvement of SP Corps officers, including BG Deydre Teyhen (65B), LTC (Ret) Anne Andrews (65C), and COL Jason Silvernail (65B).^{57,58}

The Training and Doctrine Command (TRADOC) recognized the value an SP officer brings to soldier health and readiness when it added the first authorization at the Center for Initial Military Training (CIMT) for a 65C, filled by COL (Ret) Sonya Cable, where she led the Soldier Fueling Initiative in



COL James Jones (65D), then LTC Jones, White House Physician Assistant briefing President Barack Obama.



LTC (Ret) Anne Andrews (65C) visiting units at the National Training Center as part of the Performance Triad program evaluation and research project. LTC Andrews was the lead researcher for the project in 2014.



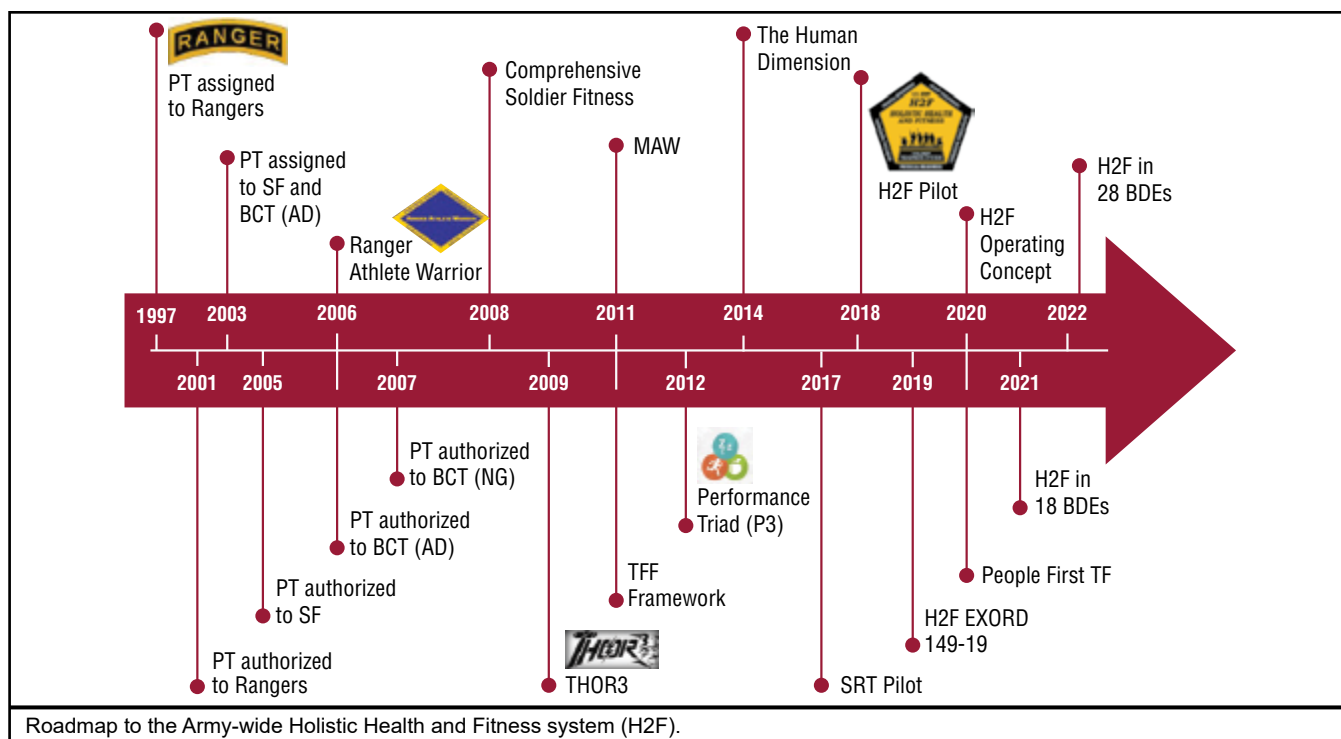
COL John Balser, 19th SP Corps Chief and first 65D SP Corps Chief, is sworn in by LTG Nadja Y. West, 44th Army Surgeon General, December 2017.



LTC Katie Yancosek (65A) with General Raymond Odierno in Afghanistan.



LTC Melissa Folsom (65B) and BG Deydre Teyhen.



support of the Soldier-Athlete Initiative.⁵⁹ Between 2016 and 2020, a 65A and a 65B were added to the CIMT TDA, completing the SP family as the CIMT team already included a 65D. Little did we know that the seed planted in 2011 would mature into SP Corps officers spearheading the development and implementation of the Army-wide Holistic Health and Fitness (H2F) initiative introduced in 2018. Development of H2F is the culmination of SP Corps officers demonstrating the benefits of their respective skillsets for soldier readiness, and that the synergistic effect of their skillsets is quite powerful. Thinking back to specific endeavors, H2F can be traced back to the Ranger Athlete Warrior (RAW) program's inception. At the time, COL Rob Montz (65A), LTC (Ret) Danny McMillian (65B), LTC Nicholas Barringer (65C), and COL John Detto (65D), served under the Regimental Surgeon, COL Russ Kotwal in the Ranger Regiment in 2006 at the program's inception (personal communication LTC Nicholas Barringer, October 19, 2021). In 2009, the Army Special Operations Command stood up the Tactical Human Optimization Rapid Rehabilitation and Reconditioning (THOR3) program.⁶⁰ THOR3 became the program for all US Army Special Operations Command (USASOC) soldiers in 2009, and further demonstrated the benefits of having a team focused on the domains identified in the Total Force Fitness framework.⁶¹ The foundation of H2F was further established through Forces Command's (FORSCOM's) Soldier Readiness Training and Test Program (SRT2P) spearheaded by LTC (Ret) Karen Daigle (65C). This four battalion pilot program resulted in favorable outcomes for units resourced with H2F team-like resources. A follow-on pilot was planned, but Army Senior Leaders decided to proceed with establishing the H2F



initiative and placed SP Corps officers in 30 battalions (though not all battalions received all AOCs due to manning challenges). Three SP Corps officers (COL David Feltwell 65B and LTC Kayla Ramotar 65C at TRADOC, and LTC (Ret) Karen Daigle 65C at FORSCOM), were key to developing the H2F system and the doctrine that followed. Also key to ensuring this effort's success were SP Corps consultants for each AOC: COL Robert Montz (65A), COL (Ret) Matthew Garber (65B), and COL Stephanie Meyer (65C). The H2F program is the culmination of years of experience and the proof of concept over more than two decades of work, and there are high expectations for its success.

As the military health care system transitioned to the authority, direction, and control of the Defense Health Agency, and in recognition of lost training time while trainees obtained necessary medical care, TRADOC initiated in 2020 the TRADOC organic medical structure. This endeavor added a primary care provider and two medics at training battalions, and a surgeon, senior medic, behavioral health officer, and behavioral health NCO in training brigades. Primary care providers were either physician assistants, nurse practitioners, or physicians. Units provided these assets showed an immediate return on investment, limiting soldiers' time away from training, thus supporting Army readiness. This initiative, along with H2F, brought more SP officers into the TRADOC footprint to support the Army's focus on readiness.

An unexpected challenge to the nation and to the Army's readiness came in January of 2020. The first case of the novel coronavirus was identified on January 20, 2020, in Snohomish County, WA.⁶² On January 30, 2020, the World Health Organization declared a Public Health Emergency of International Concern, advising countries to prepare to implement measures to contain the virus.⁶³ By March 2020, amid rising numbers of cases in the United States, universities, colleges, primary schools and workplaces transitioned to remote operations. As coronavirus cases began to stress medical capabilities in states such as New York, Washington, and Texas, SP Corps officers, both Active Component and US Army Reserve (USAR), and their enlisted counterparts, deployed as Defense Support to Civil Authorities (DSCA) assets, alongside public



CPT Lorrie Santoy (65B), MAJ Sara Mandell (63B), and CPT Sara Crews (65C); note COL (Ret) David Hamilton (65D), named behind.



CPT Ben Stricklin (65D), briefs Secretary of Defense Lloyd Austin on the 4th Infantry Division's COVID-19 vaccination clinic in Los Angeles that delivered vaccinations to over 100,000 people in 4 weeks.



1LT Adam Church (65D) and medics: Medics and unit physician assistants conducting whole blood autologous transfusion training at Camp Arifjan, Kuwait, in March 2023.



US Army and US Public Health Command physical therapists, occupational therapists, and PT and OT technicians support the COVID-19 mission at the Javits Center in New York.



Dietitians and 68Ms supporting the mass COVID-19 vaccination mission at the Javits Center in New York.

health officers and others leading the response. COL John Balser (65D), Corps Chief through November 2019, deployed to McAllen, TX, where he and other AMEDD officers provided medical care to civilians because the civilian capacity was insufficient to meet the need. COL David Hamilton, 65D Consultant, led the 9th Hospital Center in support of Operation Gotham to the Javits Center in New York, where over 42 agencies worked together to support New York's taxed medical system by providing direct patient care. In medical treatment facilities and wherever they were stationed across the United States and the world, SP Corps officers adjusted operations to meet the mission. In March 2020, while serving as the Branch Chief, Interservice Physician Assistant Program, COL James Jones was activated and appointed as the Chief Medical Advisor, Executive Office of the President by President Trump. He served on the COVID Task Force until August 2021. In addition to caring for the president, vice president, their families, and other senior U.S. Government officials, COL Jones and several physician assistants traveled to more than 94 countries planning medical contingency operations for both official presidential and vice presidential visits. In August 2020, after relinquishing command at the Walter Reed Army Institute of Research (WRAIR), serving as the second SP Corps officer selected for this SNC, BG Deydre Teyhen (65B) was hand-picked to be the DoD lead for therapeutics where she led a multi-agency team spearheading the nation's efforts to find treatments for the novel coronavirus. Her leadership resulted in the development of life-saving therapeutic agents in an unprecedented timeframe.

On December 10, 2020, BG Deydre Teyhen (65B) was sworn in as the 20th SP Corps Chief. At the strategic level, she served as the Office of The Surgeon General G-1/4/6 from June 2021 to June 2022. Due to her many career accomplishments, including those in the physical therapy profession, in the SP Corps, and in AMEDD CSL command, she gained the ultimate recognition as a senior leader in Army Medicine when she was selected for promotion to Brigadier General. On June 24, 2021, the promotion announcement was posted on the General Officer Management Office website, making her the first active component officer ever selected from the SP Corps for promotion to the general officer ranks.⁶⁴ BG Teyhen was promoted on July 8, 2022, once again making history just months after celebrating the SP Corps' 75th anniversary. She assumed command of Brooke Army Medical Center Fort Sam Houston, TX, on July 11, 2022, prepared to continue as a leader in Army Medicine and as a leader in the SP Corps, and ready to shape the SP Corps and the Army of the future.

CONCLUSION

Our foremothers probably never imagined where the SP Corps would be today. While this article does not encompass every groundbreaking event that occurred over the

past 75 plus years, it demonstrates a Corps that has grown and evolved to be uniquely positioned to meet the Army's operational needs for years to come. Today's SP Corps encompasses the knowledge, skills, attributes, and expertise needed to ensure soldier readiness and lethality as the Army prepares for large scale combat operations and focuses on multi-domain operations. By understanding our history and the evolution to the SP Corps of today, we can appreciate the depth and magnitude of our many accomplishments and trailblazing moments. Our 75th anniversary year kicks off "the decade of the SP Corps," remembering our Corps' past, celebrating the present, and embracing the promising future to come.



COL Deydre S. Teyhen, 20th SP Corps Chief, is sworn in by LTG R. Scott Dingle, 45th Army Surgeon General on 10 December 2020.

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References

1. Hartwick AN. *The Army Medical Specialist Corps. The 45th Anniversary*. Washington, DC: Center of Military History, US Army; 1993. Accessed May 5, 2022. https://history.army.mil/html/books/085/85-2/CMH_Pub_85-2.pdf
2. The AMEDD Corps History Medical Specialist. AMEDD Center of History & Heritage. <https://achh.army.mil/history/corps-medical-spec-publication>. Accessed December 20, 2022.
3. James JJ, Stuart RB. Expanded role for the physical therapist. Screening musculoskeletal disorders. *Phys Ther*. 1975;55(2):121-31. doi:10.1093/ptj/55.2.121
4. James JJ, Abshier JD. The primary evaluation of musculoskeletal disorders by the physical therapist. *Mil Med*. 1981;146(7):496-9.
5. Newton S. The growth of the profession of occupational therapy. *US Army Med Dep J*. 2007 Jan-Mar;(51-8):66-70. PMID: 20084705
6. Holesbeck LS. "PSYCH-Force 90": the OM (Combat Stress) Team in the Gulf. *US Army Med Dep J*. 1992;3:32-6.

7. Garber MB, Baxter RE. *Physical therapy in the US Army combat health support system*. A research paper presented to the US Army Command and General Staff College in partial fulfillment of the requirements for A462: *Combat Health Support Seminar*. 2003.
8. Greathouse DG, Schreck RC, Benson CJ. The United States Army physical therapy experience: evaluation and treatment of patients with neuromusculoskeletal disorders. *J Orthop Sports Phys Ther*. 1994;19:261-6. doi:10.2519/jospt.1994.19.5.261
9. Benson CJ, Schreck RC, Underwood FB, Greathouse DG. The role of Army physical therapists as nonphysician health care providers who prescribe certain medications: observations and experiences. *Phys Ther*. 1995;75(5):380-6. doi:10.1093/ptj/75.5.380
10. Physician Assistant History Society. COL(R) William "Bill" Tozier. Accessed December 1, 2022. <https://pahx.org/assistants/tozier-william/>
11. Harben J. "Trailblazing career earns award for dietitian." *Army Medicine Mercury*. 2008;35(9).
12. Stankorb SM, Salgueiro M, Grediagin A. Enteral feeding practices for U.S. service members in a deployed combat support hospital. *Mil Med*. 2009;174(7):685-8. doi:10.7205/milmed-d-01-8908
13. Rhon DI. A physical therapist experience, observation, and practice with an infantry brigade combat team in support of Operation Iraqi Freedom. *Mil Med*. 2010;175(6):442-7. doi:10.7205/milmed-d-09-00097
14. Moore J, Goffar S, Teyhen D, Pendergrass T, Childs J, Ficke J. The role of U.S. military physical therapists during recent combat campaigns. *Phys Ther*. 2013;93(9):1268-75. doi:10.2522/ptj.20120136
15. Shaffer SW, Moore JH. US Army physical therapist roles and contributions in Operations Enduring Freedom and Iraqi Freedom. *US Army Med Dep J*. 2016;(2-16):52-7.
16. Smith-Forbes E, Najera C, Hawkins D. Combat operational stress control in Iraq and Afghanistan: Army occupational therapy. *Mil Med*. 2014;179(3):279-84. doi:10.7205/MILMED-D-13-00452
17. Story KL, Bukhari AS, Bovill M. Roles of the military dietitian in combat operations and humanitarian assistance-professional development and utilization. *Mil Med*. 2016;181(10):1363-9. doi:10.7205/MILMED-D-15-00509
18. Stankorb SM, Ramsey C, Clark H, Osgood T. Provision of nutrition support therapies in the recent Iraq and Afghanistan conflicts. *Nutr Clin Pract*. 2014;29(5):605-11. doi:10.1177/0884533614543329
19. Duran-Stanton AM, Jackson AL, eds. *US Army Physician Assistant Handbook*. 2nd ed. Fort Sam Houston, TX: Borden Institute, US Army Medical Center of Excellence; 2021.
20. Hawkins D. Starting a Combat Stress Center in a Deployed Environment. *Army Medical Specialist Corps Connection*. April 15, 2010:3.
21. Daniels R Jr. In-Country Therapy: Clinic Treats Soldiers with Brain Injuries. *Fort Campbell Courier*. July 8, 2010.
22. Stringer H. OTs Aid Growing Number of Soldiers with PTSD (Article from TodayinOT.com). *Army Medical Specialist Corps Connection*. August 15, 2010:8-9.
23. Cobbeldick B. Sky Soldiers Open Afghanistan's First mild Traumatic Brain Injury Clinic. *Army Medical Specialist Corps Connection*. August 15, 2010:10.
24. Gerardi S, Newton S. The role of the occupational therapist in [Combat Stress Control] CSC operations. *US Army Med Dep J*. 2004;20-7.
25. Smith-Forbes E, Najera C, Hawkins D. Combat operational stress control in Iraq and Afghanistan: Army occupational therapy. *Mil Med*. 2014;179(3):279-84. doi:10.7205/MILMED-D-13-00452
26. Smith-Forbes EV, Quick CD, Brown KM. Roles of occupational therapists in theater, past and present. *US Army Med Dep J*. 2016;(2-16):66-70.
27. Montz R, Gonzales F Jr, Bash DS, Carney A, Bramlett D. Occupational therapy role on the battlefield: an overview of combat and operational stress and upper extremity rehabilitation. *J Hand Ther*. 2008;21(2):130-5. doi:10.1197/j.jht.2007.12.008
28. Davis S. Timmy the Therapy Dog. *Army Medical Specialist Corps Connection*. August 15, 2010:12.
29. Krol W. Training the combat and operational stress control dog: an innovative modality for behavioral health. *US Army Med Dep J*. 2012;46-50.
30. Beck CE, Gonzales F, Sells H, Jones C, et al. The effects of animal-assisted therapy on wounded warriors in an occupational therapy life skills program. *US Army Med Dep J*. 2012;38-45.
31. Fike L, Najera C, Dougherty D. Occupational therapists as dog handlers: the collective experience with animal-assisted therapy in Iraq. *US Army Med Dep J*. 2012;51-4.
32. Gregg B. Crossing the Berm: An occupational therapist's perspective on animal-assisted therapy in a deployed environment. *US Army Med Dep J*. 2012;55-6.
33. Coleman C. Military Advanced Training Center Opens at WRAMC. https://www.army.mil/article/4849/military_advanced_training_center_opens_at_wramc. Published September 13, 2007. Accessed November 29, 2022.
34. Lamance R. Center for the Intrepid opens its doors. Air Force Print News. Published January 30, 2007. Accessed November 29, 2022. <https://www.af.mil/News/Article-Display/Article/128212/center-for-the-intrepid-opens-its-doors/>
35. Extremity Trauma and Amputation Center of Excellence (EACE). Published January 18, 2022. Accessed November 29, 2022. <https://health.mil/Military-Health-Topics/Centers-of-Excellence/EACE>
36. Mitsch S. WRAMCs Military Advances Training Center Staff Travel to Pakistan. *Army Medical Specialist Corps Connection*. August 15, 2010:11.
37. Robins K, Stankorb SM, Salgueiro M. Energy expenditure in acute posttraumatic amputation: comparison of four methods for assessment. *Nutr Clin Pract*. 2013;28(6):758-65. doi:10.1177/0884533613507605
38. Howell A, Pruziner A, Andrews A. Use of predictive energy expenditure equations in individuals with lower limb loss at seated rest. *J Acad Nutr Diet*. 2015 Sep;115(9):1479-85. doi:10.1016/j.jand.2015.05.019
39. Eckard CS, Pruziner AL, Sanchez AD, Andrews AM. Metabolic and body composition changes in first year following traumatic amputation. *J Rehabil Res Dev*. 2015;52(5):553-62. doi:10.1682/JRRD.2014.02.0044
40. Amorelli CR, Baumann ML, Yancosek KE, Keizer BM, Stinner DJ, Wilken JM. Center for the Intrepid: providing patients POWER. *US Army Med Dep J*. 2016;39-46.
41. Amorelli CR, Sposato L. War and rehabilitation: occupational therapy's power to transform disability into ability. *US Army Med Dep J*. 2016;35-8.
42. Sposato L, Yancosek K, Lospinoso J, Cancio J. Psychosocial reactions to upper extremity limb salvage: A cross-sectional study. *J Hand Ther*. 2018;31(4):494-501. doi:10.1016/j.jht.2017.05.020
43. JC. MEDSEM. *Army Medical Specialist Corps Connection*. April 15, 2010:19-20.
44. Chapter 1. Detrow JF, Balser JE, Broussard DW, et al. *From Vietnam to Afghanistan: The history of the Army Physician Assistant*. In: US Army Physician Assistant Handbook. 2nd ed. Fort Sam Houston, TX: Borden Institute, US Army Medical Center of Excellence; 2021.
45. Reinert B. Bathalon says goodbye to USARIEM. Published August 10, 2012. Accessed December 1, 2022. https://www.army.mil/article/85228/bathalon_says_goodbye_to_usariem
46. Konkright WR, Barringer ND. Energy expenditure and load carriage exceeded military recommendations in Special Operations Forces deployed to Afghanistan. *Mil Med*. 2014;179(3):279-84. doi:10.7205/MILMED-D-13-00452

47. About the Cultural Support Program. Accessed December 1, 2022. <https://www.soc.mil/CST/about.html>
48. 28th CSH Arrives to Replace 10th CSH: NCD-Sather. *Army Medical Specialist Corps Connection*. January 15, 2010:6.
49. Khan JM. Supporting the Development of Iraqi Healthcare System through Sharing. *Army Medical Specialist Corps Connection*. December 15, 2010:13.
50. Physician Assistant History Society. George McCullough Oral history interview. Published May 24, 2008. Accessed December 20, 2022. <http://pahx.pastperfectonline.com/archive/FA928256-CCFB-4053-A6AE-932452354759>
51. Kuttler H. PA LTC Jones Practices Protective Medicine at the White House. Published December 11, 2018. Accessed December 20, 2022. <https://www.aapa.org/news-central/2017/11/pa-ltc-jones-practices-protective-medicine-white-house/>
52. Diamond C. Army officer assigned to White House receives lifesaving award from Secret Service boss. *ArmyTimes*. Published April 17, 2017. Accessed December 20, 2022. <https://www.armytimes.com/news/your-army/2017/04/14/army-officer-assigned-to-white-house-receives-lifesaving-award-from-secret-service-boss/>
53. Chairman of the Joint Chiefs of Staff Instruction 3504.01: Chairman's Total Force Fitness Framework. September 1, 2011.
54. Horoho PD. A system for health: essential element of national security. *US Army Med Dep J*. 2013;4.
55. Nindl BC, Williams TJ, Deuster PA, Butler NL, Jones BH. Strategies for optimizing military physical readiness and preventing musculoskeletal injuries in the 21st century. *US Army Med Dep J*. 2013;5-23.
56. Horoho PD. A system for health: essential element of national security. *Army Medicine Mercury*. 2013;41(3):4.
57. Army Medicine. 2013 year in review. *Army Medicine Mercury*. February 2014;37-8.
58. Frady K. Medical Specialist Corps Celebrates 66 Years of Service. *Army Medicine Mercury*. April 2013:10.
59. Soldier-Athlete Initiative. *Army Medical Specialist Corps Connection*. December 15, 2010:22.
60. Smith S. THOR3: The Army's Answer to Human Optimization. Published December 3, 2019. Accessed December 21, 2022. <https://www.military.com/military-fitness/thor3-armys-answer-human-optimization#:~:text=In%202009%2C%20Army%20Special%20Operations,has%20embraced%20the%20program%20fully>
61. Kelly TK, Masi R, Walker BA, Knapp SA, Leuschner KJ. An Assessment of the Army's Tactical Human Optimization, Rapid Rehabilitation and Reconditioning Program. Santa Monica, CA: RAND Corporation, 2013.
62. Holshue ML, DeBolt C, Lindquist S, et al. First case of 2019 novel coronavirus in the United States. *N Engl J Med*. 2020;382(10):929-36. doi:10.1056/NEJMoa2001191
63. COVID-19 Public Health Emergency of International Concern (PHEIC) Global Research and innovation forum. World Health Organization. Published February 12, 2020. Accessed December 22, 2022. [https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-\(pheic\)-global-research-and-innovation-forum](https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-(pheic)-global-research-and-innovation-forum)
64. Announcements June 24, 2021. General Officer Management Office. Published June 24 2021. Accessed December 22, 2022. <https://www.gomo.army.mil/ext/portal/Resources/InLineAnnouncement.aspx?AnnouncementID=3026>

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The History of Army Physical Therapy

CPT Nathaniel Angus; LTC Leigh Anne Lechanski; CPT Lyndsee Loehr; MAJ Mark Mateja; COL Jason Silvernail; COL Scott Gregg; MAJ Stephanie Fournier

OVERVIEW

The United States Regular Army currently has stationed worldwide 390 military Doctors of Physical Therapy (DPTs) who maximize physical performance, prevent injuries, and rehabilitate soldiers quickly while ensuring readiness to deploy, fight, and win the nation's wars.¹ In addition, Army physical therapists support Special Operations, brigade combat teams (BCTs), military treatment facilities (MTFs), academia, research, and Holistic Health and Fitness (H2F) Human Performance Teams. Army physical therapists, recognized as musculoskeletal experts and critical combat multipliers, owe their present-day success to the early pioneers of the profession and subsequent innovators of the past 100 years. Army physical therapists have served in every major conflict since the inception of Reconstruction Aides during World War I with numerous evolutions in functions and roles throughout history into modern, highly skilled, licensed independent practitioners.

1910-1940

Reconstruction Aides

In the United States (US), physical therapy (physiotherapy) became institutionalized through reconstruction aides, or "re-aides" (Figure 1) who treated injured World War I service members. Initially, these re-aides were physical education teachers who completed on-the-job training to meet the war-related demands for rehabilitative care.



Figure 1. Reconstruction Aides provided physical therapy services to injured service members during World War I. Here patients are being treated with manual therapy intervention to improve function. Photograph from <https://military.robins.baylor.edu/physical-therapy/physical-therapy-dpt/about/program-history>.

Additionally, re-aides were proficient in physical exercise instruction and at least two standard therapeutic modalities of the time: hydrotherapy, mechanotherapy, massage, or electrotherapy.² By 1919, the US Government employed over 700 Reconstruction Aides at 45 hospitals to treat an estimated 50 000 patients injured during World War I.³

1917 Walter Reed General Hospital

This new rehabilitation mission requirement validated the need for formalized and scalable instruction in physical therapy. The Army created a 4-month training course at Walter Reed General Hospital that was authorized in 1917 by The Army Surgeon General, Major General William Gorgas. Major General Gorgas appointed Ms. Mary McMillian, one of the country's first Reconstruction Aides, to oversee the US Army Physiotherapy Department. By 1918, 14 other academic and hospital institutions were educating rehabilitation aides striving to meet the demands of World War I. The US Army Medical Department Professional Service School at Walter Reed General Hospital established an accredited postgraduate course in physiotherapy in the fall of 1922.^{2,3}

1940-1960

World War II

World War II opened the doors to commissioning women physical therapists into the Army. As the need for physical therapists to mobilize overseas increased, The Army Surgeon General, Major General Norman Kirk, expressed concern over the lack of status and protections these civil employees held. He recommended a study to justify the request to grant these essential providers the same military status as Army Nurse Corps officers. The resulting Public Law 828 (77th Congress) that passed on December 22, 1942, awarded 279 civilian physical therapists officer appointments in the US Army. These officers were finally granted full military membership status under Public Law 350 (78th Congress) on June 22, 1944, and Executive Order No. 9454 on July 10, 1944.⁴

On December 22, 1942, 44 physical therapists deployed to hospital units across all US areas of operations in support of World War II. Repeatedly, Army physical therapists demonstrated the mission-critical role of an embedded rehabilitation provider with forward operations in large, mobilized hospital units. In light of this impact, requests for physical therapists in these overseas hospitals received top priority.^{4,5}

Physical therapists and physical therapy assistants displayed ingenuity and creativity in building makeshift clinics ranging from tent-covered patient care areas to clinics inside hospital buildings. They acquired and repurposed materials to offer therapeutic modalities and provided resistance exercise training to return injured patients to duty.⁴

In addition to Army physical therapists serving in hospital units of every operational theater during World War II, two therapists were assigned to the first activated Army hospital ship, the Arcadia. By the end of the War in 1945, 681 Army physical therapists completed overseas assignments by providing forward care primarily in hospital settings.⁴

Establishment of the Corps

Although Public Law 350 (78th Congress) granted Army physical therapists full military membership status after 1945, appointments were limited to only 6 months. On April 17, 1947, Public Law 36 was signed by the President, Harry S. Truman. This law sanctioned the establishment of the Women's Medical Specialist Corps in the Regular Army and created a permanent authorization for physical therapy officers.⁴

Men's service in the profession of military physical therapy had been well established during times of conflict as Reconstruction Aides. On August 9, 1955, the 84th Congress passed Public Law 84-294, authorizing the commissioning of male officers into the Corps. The name subsequently changed to the Army Medical Specialist Corps to include both sexes.^{2,6}

Korea

Army physical therapists continued to provide necessary medical care during the Korean War, again serving overseas with mobilized hospital units. These professionals provided care to American service members, allied forces, local nationals, and prisoners of war. In addition to clinical care, physical therapists supported the local communities by establishing rehabilitation training programs for Korean medical personnel and designing local clinics.²

1960-1980

Vietnam

In March 1966 during the Vietnam War, Major Barbara Gray volunteered for duty as an Army physical therapist in Saigon with the 17th Field Hospital. She was the first Army Medical Specialists Corps officer to be purposely assigned to a combat area. Her work, specifically with soft-tissue extremity injuries, demonstrated the value of forward rehabilitation care. Using her influence as the consultant to the 68th Medical Group, she successfully lobbied to have 10 additional therapists assigned in Vietnam. In 1967, physical

therapists were assigned to the US Army Field, Evacuation, and Convalescence Hospitals.^{2,7}

While the primary role of the Army physical therapist originated in the rehabilitation of patients capable of returning to duty, these officers were also fully qualified to provide consultation to military unit leadership outside the clinic setting to optimize community health. Seven physical therapists performed as consultants to the US Military Assistance Command, Vietnam Surgeon, and the 44th Medical Brigade Commander. From March 1966 until February 1973, 47 physical therapists served in Vietnam.²

Advancements in Responsibility

Due to a shortage of military physicians in the mid-1970s, Army physical therapists expanded their scope of practice to perform initial triage and treatment for musculoskeletal conditions. This extended available medical capabilities and expedited return-to-duty timelines.^{2,6} This practice was the first physical therapy "direct-access" system, and this model is still in place as a best practice in military medicine. Due to the advancements of Army physical therapists as autonomous neuromusculoskeletal professionals and to support this new model of care, Baylor University partnered with the Army in 1971 to upgrade the program from a postgraduate certificate to a master's degree in physical therapy.^{2,6,8}

The Army became more focused on soldiers' physical health and conditioning in the 1970s and into the 1980s and naturally turned to physical therapy officers as subject matter experts in performance optimization. Drawing from their expertise in sports medicine, Army physical therapists designed, implemented, and supervised exercise programs while conducting medical screening for soldiers over 40 years of age. A 1980 update to Army Regulation (AR) 600-9 limited body fat percentage calculation to certified practitioners as part of the Army Weight Control Program. The Army Surgeon General named physical therapists, as well as other Army Medical Specialist Corps officers, capable of performing official body fat calculations. Physical therapists served in this readiness capacity until AR 600-9 was further revised in 1986, transitioning these responsibilities to unit commanders.²

1980-2000

The 1980s saw a significant shift in the prioritization of the Army to directly support unit combat readiness and physical fitness outside the footprint of the Army Medical Treatment Facilities. A 1980 update to Army Regulation (AR) 600-9 limited body fat percentage calculation to certified practitioners as part of the Army Weight Control Program. The Army Surgeon General named physical therapists, as well as other Army Medical Specialist Corps officers, capable

of performing official body fat calculations. Physical therapists served in this readiness capacity until AR 600-9 was further revised in 1986, transitioning these responsibilities to unit commanders.² In response to this enhanced mission requirement, the Army Medical Specialist Corps began assigning physical therapists to troop fitness centers and combat units during training exercises and permanent research positions in exercise physiology at the US Army Research Institute of Environmental Medicine.² In 1984, Army Medical Specialist Corps positions were created within the Office of The Army Surgeon General and the US Army Forces Command (FORSCOM) staff to improve training and readiness.² The US Government funded allocations to attend the United States Army Medical Department Advanced Course, Combined Arms and Services Support School, Command and Staff College, and the Army War College² to further invest in these emerging strategic officers' professional development.

Gulf War

Following the Iraqi invasion of Kuwait in August 1990, the United States and the United Nations quickly responded with a buildup of occupying troops in Southwest Asia. The US Government deployed 44 Army hospitals with Army National Guard and Reserve medical assets assigned to the area between August 1990 and January 1991. By January 1992, five Army physical therapists arrived in support of staff Station, Evacuation, and Combat Support Hospitals, in addition to the traditional Mobile Army Surgical Hospital units.² Reinforced by the lessons learned about the value of forward physical therapists in Vietnam, these therapists again proved that aggressive physical therapy involvement early in injury rehabilitation improved outcomes and shortened the length of recovery.² In an after-action report, one of these therapists reported treating 233 soldiers, requiring an average of three visits and resulting in a 90% return-to-duty rate.⁹

Doctoral Physical Therapy Programs and Fellowships

The 1990s saw immense advancements in military medical professional education, both in clinical skillsets and academic research, primarily driven by Army physical therapists. After the justification of the role of physical therapists as primary neuromusculoskeletal practitioners, senior leaders developed advanced training programs to cultivate the clinical scientist. For example, the US Military – Baylor University Doctoral Fellowship in Sports Physical Therapy at the United States Military Academy, West Point, New York, was founded in 1994.¹⁰ Similarly, in 1995, the US Army – Baylor Doctoral Fellowship in Orthopaedic Manual Physical Therapy was established at Brooke Army Medical Center, Fort Sam Houston, Texas.¹¹ Both programs aimed to develop master clinicians by teaching evidence-based, advanced clinical reasoning and research skills. Ultimately, these investments and advances in training curricula culminated in both programs awarding a Doctor of Science degree in Physical Therapy and earning accreditation of fellowship program status by

the American Board of Physical Therapy Residency and Fellowship Education. In 2002, the entry-level Army – Baylor Physical Therapy program transitioned to granting the Doctor of Physical Therapy degree via a 3-year curriculum, further enhancing the knowledge and capabilities of Army physical therapists.⁶

2000-2020

Embedded Physical Therapy Assets

The United States Army Rangers recognized the value of having skilled physical therapists on the team and in early 2000 integrated them into the 75th Ranger Regiment as an organic medical resource. Embedding medical officer assets into this unique unit setting allowed the Army physical therapists to implement traditional rehabilitation techniques while conducting injury surveillance and human performance programming in what would become the soldier sports medicine model.¹² This implementation immediately provided a return on investment, with the Rangers' operational readiness improving from 88% to 95% within 10 months.⁹ After initially borrowing workforce from the local Army Military Treatment Facility, the 75th Ranger Regiment made the physical therapist manning permanent by converting a combat arms officer billet into a physical therapist position.

This revolutionary change to modify manning documents with medical providers soon spread to special forces groups and BCTs in 2003 and 2006, respectively.¹³ From 2001 to 2011, 162 Army physical therapists (single individual shown in Figure 2) completed an estimated 222 deployments to Iraq or Afghanistan.⁶ Between direct access and early intervention,



Figure 2. Dr (CPT) Bradley Ritland provides forward musculoskeletal care at a combat outpost in Afghanistan while assigned to the 2nd Infantry Division as a Brigade Combat Team Physical Therapist in 2010. Photograph courtesy of CPT Bradley Ritland.

Army physical therapists demonstrated a substantial impact on the performance and readiness of the nation's fighting forces. Since then, physical therapists have continued to serve as command team consultants for injury prevention and health promotion, optimizing overall soldier and unit readiness.

White House Medical Unit

The early 2000s continued to be defined by rapid expansion in the scope and responsibility of physical therapists within the Army and other uniformed services. The Office of the Physician to the President recognized the need for a complement of specialized medical practitioners to support the health and welfare of the military's Commander in Chief and those who serve within the White House.¹⁴ As a result, the White House Medical Unit added specialty providers such as active-duty physical therapists who served under presidential administrations from 2005 until 2021. Army physical therapists, primarily from Walter Reed National Military Medical Center and Fort Belvoir Army Community Hospital, provided executive medical care on demand to the nation's most senior leaders—at the White House, the Eisenhower Executive Office Building, Camp David, and around the world on Air Force One.

Performance Triad

In 2013 The Army Surgeon General, Lieutenant General Patricia Horoho, USA Retired, launched the Performance Triad pilot program. The initiative prioritized proactive health management and fitness across the force, changing the healthcare system into a system for health. The Performance Triad Program incorporated the three pillars of health: sleep, activity, and nutrition.¹⁵ Army Medical Specialist Corps physical therapists and dietitians developed this standardized and evidenced-based curriculum that taught Soldiers how to invest in their wellness through self-care activities. That same year Army physical therapists were authorized positions in a total of 45 BCTs to reinforce Performance Triad concepts with performance optimization programs and to provide embedded neuromusculoskeletal medical care.⁶ This became a bridge to the current Holistic Health and Fitness (H2F) Program, released in 2020 as the Army Field Manual 7-22, Holistic Health and Fitness. This paradigm shift transformed a reactive health system into a proactive strategy for health with shared responsibility between soldiers, commanders, and medical providers to enable readiness and resilience.

Army physical therapy forms a critical component of Holistic Health and Fitness, the Army's primary means for achieving Soldier readiness and lethality. Associated doctrine incorporates several domains, including mental and spiritual elements, to promote comprehensive soldier readiness.¹⁶ This program will add teams of physical therapists, occupational therapists, dietitians, athletic trainers, strength coaches, and cognitive enhancement specialists to 110 brigade elements over the next 10 years. Army physical

therapists assigned to these teams facilitate performance optimization programs to enhance the health and readiness of the total force.¹⁷ Therefore, H2F optimizes physical and nonphysical performance, reduces injury rates, improves rehabilitation after injury, and increases the overall combat effectiveness of the force.¹⁶

Senior Leaders

Most recently, Brigadier General Deydre Teyhen, an Army physical therapist and the former lead project officer for the Performance Triad, became the first authorized Regular Army Medical Specialist Corps officer to be promoted to the rank of General Officer. From this leadership position as the 20th Chief of the United States Army Medical Specialist Corps, she can enhance Army readiness by advocating for expanded resources and education opportunities for Army physical therapists, occupational therapists, dietitians, and physician assistants. Strong advocacy from senior ranking officers such as Brigadier General Teyhen and other Army senior leaders will facilitate the appropriate end strength required to support Army mission requirements and capabilities.¹⁸

ARMY PHYSICAL THERAPISTS TODAY

The roles and functions of Army physical therapists remain relevant today to the readiness requirements of the Army. According to the 2020 Health of the Force Report, "injuries were the leading cause of medical non-readiness, accounting for 64% (10.1 million days) of all limited duty days in 2019, affecting over 154,000 Soldiers."¹⁹ As a result of this demand signal, Army DPTs operate today in multiple settings, including MTFs (Figure 3), Forces Command (FORSCOM), Training and Doctrine Command, Army Futures Command,



Figure 3. Dr (MAJ) Janet Papazis assists a service member with limb loss conduct therapeutic exercise at Walter Reed Army Medical Center in 2004. The Department of Defense now operates three advanced rehabilitation centers that support patients with limb loss and polytrauma injuries. Photograph courtesy of MAJ Janet Papazis.

and Special Operations Command units. In addition, Army DPTs support numerous research, teaching, and administrative roles throughout the Army and Department of Defense. The Army physical therapy community is derived from multiple recruitment sources for DPTs, such as: the Army – Baylor University Doctor of Physical Therapy Program, United States Army Reserve Officer Training Corps Educational Delay Program, direct commission of officers from the civilian sector, and Department of the Army and Department of Defense civilians.

Army physical therapists are now licensed independent providers who are privileged to order diagnostic imaging, prescribe medications, generate specialty consults, and issue duty-limiting profiles under autonomous clinical privileges within the military health system. Army DPTs safely and effectively evaluate and treat neuromusculoskeletal conditions without a required referral. This care is provided in garrison and deployed environments to maximize military readiness, reduce medical evacuations from combat theaters, and decrease limited duty time. Most Army physical therapy clinicians are also board certified by the American Board of Physical Therapy Specialties, in areas such as orthopedics, sports, women's (pelvic) health, geriatrics, neurology, and electrophysiology.

Direct access to physical therapy in the military has radically reduced healthcare utilization and improved patient satisfaction compared to referral-based treatment.²⁰ Patients seeing physical therapists in this direct-access setting need fewer therapy visits to recover and fewer visits with primary care physicians. The advanced role of Army physical therapists as nonsurgical neuromusculoskeletal care providers has resulted in lower overall healthcare costs due to a decrease in unnecessary imaging studies, decreased medication use, and less frequent surgical interventions.^{21,22}

CLOSING

The profession of Army physical therapy has developed tremendously from its inception of primarily war-related mission requirements. It has evolved from a dozen pioneering Reconstruction Aides treating war injuries to a robust community of autonomous licensed independent practitioners—who deploy worldwide to provide direct and early access to neuromusculoskeletal rehabilitation and performance optimization programming. Army physical therapists are proven readiness enablers with a rich history as innovative trailblazers, establishing the profession in the United States and evolving its practice to provide reformed, relevant, readiness-oriented, and compassionate care.

The Army physical therapy profession's recent growth in personnel and responsibility is evidence of the well-established value this care provides to conserve the fighting force. These unique skills' relevance remains high with the shift to multi-domain operations that require all Soldiers, those in combat and support, to maintain optimal health and wellness as a driver of lethality.

References

1. AMEDD Reporting Officer and Enlisted Summary Reports. AMEDD Web Reporting. Published September 8, 2022. Accessed September 8, 2022. <https://hr.mods.army.mil/AWR/Home/Index>
2. Hartwick AMR. *The Army Medical Specialist Corps: The 45th Anniversary*. Center of Military History, United States Army; 1993. https://history.army.mil/html/books/085/85-2/CMH_Pub_85-2.pdf
3. Moffat M. The History of Physical Therapy Practice in the United States. *J Phys Ther Educ*. 2003;17(3):15-25. doi:10.1097/00001416-200310000-00003
4. Vogel EE. Physical Therapists in the Army: Part II. *Phys Ther Rev*. 1952;32(11):561-577. doi:10.1093/ptj/32.11.561
5. Vogel EE, Lawrence MS, Strobel PR. Professional services of physical therapists, World War II. In: Anderson RS, ed. *Army Medical Specialist Corps*. Office of The Surgeon General, Department of the Army; 1968:235-85. <https://achh.army.mil/history/corps-medical-spec-publication>
6. Program History. Army – Baylor DPT | Baylor University. Accessed July 10, 2022. <https://www.baylor.edu/graduate/pt/index.php?id=27031>
7. Neel SH. *Vietnam Studies: Medical Support of the U.S. Army in Vietnam, 1965-1970*. Department of the Army; 1973:158-161. Accessed August 17, 2022. https://history.army.mil/html/books/090/90-16/CMH_Pub_90-16.pdf
8. Friz BR. Physical Therapy Education Programs, 1947-61. In: Anderson RS, ed. *Army Medical Specialists Corps*. Office of The Surgeon General, Department of the Army; 1968:445-79. <https://achh.army.mil/history/corps-medical-spec-publication>
9. Moore JH, Goffar SL, Teyhen DS, Pendergrass TL, Childs JD, Ficke JR. The role of US military physical therapists during recent combat campaigns. *Phys Ther*. 2013;93(9):1268-75. doi:10.2522/ptj.20120136
10. Background & History. U.S. Army – Baylor Sports PT, West Point | Baylor University. Accessed August 24, 2022. <https://www.baylor.edu/sportspt/index.php?id=90900>
11. Program History. Army – Baylor OMPT/Orthopaedic Manual Physical Therapy | Baylor University. Accessed July 10, 2022. <https://www.baylor.edu/ompt/index.php?id=52449>
12. Shaffer SW, Moore JH. US Army physical therapist roles and contributions in Operations Enduring Freedom and Iraqi Freedom. *US Army Med Dep J*. 2016;(2-16):52-7.
13. Mochmer P. Army Physical Therapy -- a Proud History and Integral Force in Neuromusculoskeletal Care and Readiness. U.S. Army. Published October 23, 2013. Accessed July 13, 2022. https://www.army.mil/article/113614/army_physical_therapy_a_proud_history_and_integral_force_in_neuromusculoskeletal_care_and_readine
14. White House Military Office - White House Medical Unit. georgewbush-whitehouse.archives.gov/whmo/whmu.html. Accessed August 24, 2022. <https://georgewbush-whitehouse.archives.gov/whmo/whmu.html>
15. STAND-TO! The Performance Triad. U.S. Army. Published August 15, 2015. Accessed July 19, 2022. <https://www.army.mil/standto/archive/2015/08/12/>

16. Bigelman K. *Holistic Health and Fitness (H2F) Implementation*. Center for Initial Military Training. Accessed July 19, 2022. [https://usacimt.tradoc.army.mil/assets/H2F%20101%20\(Appeared%20for%20Public%20Release\).pdf](https://usacimt.tradoc.army.mil/assets/H2F%20101%20(Appeared%20for%20Public%20Release).pdf)
17. Physical Therapy in the U.S. Army. Rehabilitation & Reintegration Division (R2D). Accessed July 11, 2022. <https://www.armymedicine.army.mil/R2D>
18. "On the Shoulders of Giants": Q&A With First PT Promoted to Army Brig General. American Physical Therapy Association. Published September 8, 2021. Accessed July 15, 2022. <https://www.apta.org/article/2021/09/08/teyhen-article>
19. United States Army Public Health Command. *2020 Health of the Force Report*; 2020. Accessed July 7, 2022. <https://phc.amedd.army.mil/PHC%20Resource%20Library/2020-hof-report.pdf>
20. Ojha HA, Snyder RS, Davenport TE. Direct access compared with referred physical therapy episodes of care: a systematic review. *Phys Ther*. 2014;94(1):14-30. doi:10.2522/ptj.20130096
21. Piscitelli D, Furmanek M, Meroni R, De Caro W, Pellicciari L. Direct access in physical therapy: a systematic review. *Clin Ter*. 2018;169(5):e249-e260. doi:10.7417/CT.2018.2087
22. Hon S, Ritter R, Allen DD. Cost-effectiveness and outcomes of direct access to physical therapy for musculoskeletal disorders compared to physician-first access in the United States: systematic review and meta-analysis. *Phys Ther*. 2021;101(1). doi:10.1093/ptj/pzaa201

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Deployed Army Dietitians: Nutrition “Jack of All Trades”

COL Renee E. Cole, PhD, RDN, LD

Army dietitians (military occupational specialty 65C) are considered a “jack of all trades” because of the diverse nutrition skillset required of the profession. This concept is amplified within the military for those dietitians who deploy in support of combat, humanitarian, and stability operations. Occasionally, Army dietitians deploy to support missions outside of the typical scope of practice (ie, research, public affairs, or staff functions), yet still seek out opportunities to bring nutrition to the forefront regardless of the primary mission.

I was fortunate to deploy as the Human Protection Administrator (HPA) as a member of the Joint Combat Casualty Research Team (JC2RT) for just over a year (January 2011–2012). To my knowledge, only two Army 65Cs, Colonel Gaston Bathalon, USA (Retired) and Colonel LesLee Funderburk, USA (Retired), previously served on this team. The JC2RT is a small 8- to 12-member team comprised of health care researchers whose primary function is to assist other deployed clinicians to initiate and conduct research. Many of our medical advancements result from research conducted during times of war, but research studies take time to develop, receive ethical approval, and complete. As the HPA for the JC2RT, I was the “eyes and ears” for the Medical Research Development Command’s Institution Review Board who approved research prior to conduct. Members of the JC2RT worked out of four main health care facilities within Afghanistan; my home base was Bagram Air Base. I traveled monthly to a variety of locations by way of aircraft. Some days I was on top of the world—sitting in the cockpit of a C-130 watching the pilots do a combat roll, ending the flight on a very short airstrip in a remote location. While on other less-fond occasions, I found myself locked knee-to-knee with other passengers in cramped seating, sick from evasive flight operations with only a small plastic bag and a helmet to shield my distress.

Although I deployed specifically to facilitate research in theater, I found many opportunities to incorporate my nutrition skillset in my 380-day deployment. Bagram Air Base, as a staging area and transient stop for most in-theater personnel, was essentially a city of approximately 30 000 military, contractors, and international partners. We had five dining facilities, three fitness gyms, numerous housing areas, Craig Joint Theater Hospital, an airstrip, and a variety of supporting merchants and organizations—a diverse population and unique environment. Nutrition professionals are typically

sparse in theater, which opens the door to get involved where desired. I became the Nutrition Consultant for the US Armed Forces Commander in Afghanistan. I received requests from the Special Forces community to obtain special nutritional supplements (protein beverages) to augment expected energy deficits during arduous missions. Supplementation is costly, so I reviewed and approved requests on a case-by-case basis. Unit justification demonstrated that mission energy expenditure was likely to surpass attainable nutrient and energy intake from meals.

I provided group classes and individual nutrition counseling to both local and remote soldiers. Although neither ideal nor a widely accepted US practice in 2011, many of the individual nutrition counseling and group classes were conducted via the phone. Remote individual counseling was easier to facilitate compared to the challenges and impersonal nature of a group medical nutrition therapy session over the phone. I had access to online nutrition resources, sent information via email in advance, and engaged soldiers with open-ended questions. Follow-up sessions were rare, and I had no way to verify or formally document individual progress. Unit administrators monitored soldier enrollment on the Army Body Composition Program, and I verified a soldier’s medical nutrition therapy attendance, and unit leadership at the assigned remote locations conducted soldier body measurements. Given the circumstances, offering informal nutrition services was better than the alternative: no services.



Figure 1. Major Renee Cole conducting nutrition outreach at the Armed Forces Network. Photograph courtesy of Colonel Renee Cole.

The most comprehensive nutrition activity that I completed was to revitalize the Go For Green® (G4G) nutrition program within the 26 theater dining facilities. My predecessor, Colonel LesLee Fundeburk, USA (Retired), developed a close working relationship with the theater food service contractor. She laid a foundation, so I could pick up where she left off. I recruited the assistance of three Air Force dietitians who rotated at separate times through Craig Joint Theater Hospital in Bagram during my tour. Together we completed menu analysis for over 700 food items, revitalized the G4G cards, assisted with staff education, and created some marketing materials. I traveled to Kuwait and Qatar to attend the Department of Defense semiannual Food Service Support Meeting and provided my insight on challenges, potential menu changes, and status updates on the revised G4G implementation.

For nutrition outreach, I wrote a monthly nutrition article in the *Afghanistan Watch* magazine, which was distributed throughout theater, and had weekly radio segments on the Armed Forces Network (Figure 1). I took the opportunity to bring a little fun to some dry nutrition topics (ie, fiber, caffeine, weight management) by presenting odd yet fun facts along with realistic strategies to maintain or improve health in a deployed setting. While working with the radio staff, I capitalized on the offer to create some ear-catching commercials to support the G4G marketing initiative. My fellow JC2RT mates and I created several short “DFAC Jack” commercials. Similar to the “Office Linebacker” concept, DFAC Jack “takes you out” if you are found eating too many high-fat, low-nutrient-quality foods (red-coded items). DFAC Jack’s motto was “Never go full red, go for green instead!”

But my most eye-opening nutrition-related experience involved a congressional request to assess the nutritional status of Afghanistan Army soldiers admitted as patients to the Afghanistan National Army hospital in Kabul, Afghanistan. I traveled by helicopter with an Air Force dietitian (Figure 2) to the US Army National Kabul Center, a



Figure 2. Majors Renee Cole (Army) and Risa Riepma (Air Force) at the National Afghanistan Army Hospital in Kabul, Afghanistan, January 2012. Photograph courtesy of Colonel Renee Cole.

small military compound (no more than 0.7-mile diameter) within the larger Afghanistan Army compound. We stayed in Kwanza Hut temporary lodging, worked out of a small shared office, and had a security force escort to the hospital on several occasions. The Afghan hospital’s pharmacist covered nutrition guidance, as there were no nutrition professionals. In the United States, we take for granted that healthcare workers welcome caring for all patients regardless of their “tribe.” However, it was commonplace for Afghanistan family members to stay in the hospital room to ensure basic care and feeding occurred. A main staple of the patient tray was a stew made with a lamb or goat (and fill such as a few vegetables, legumes, or rice) along with a flour-based gruel and naan (flat bread). Dairy and fruit were rarely available and often pilfered. Food production occurred in a kitchen located in an adjoining building’s basement. Ten burners lined the wall to cook the stew in 5- to 10-gallon pots, which were set on the floor along an opposite wall to cool before distributing. The meat was butchered in a small adjacent room that was followed by a space where three older men sat dicing potatoes (Figures 3). Naan was



Figures 3. (A) The National Afghanistan Army Hospital kitchen. (B) Staff member at the National Afghanistan Army Hospital butchering meat in preparation for cooking. (C) Staff prepare potatoes for cooking at the National Afghanistan Army Hospital.



Figure 4. Earthen basement used to cook naan bread for the National Afghanistan Army Hospital.



Figure 5. Staff distributes food to patients at National Afghanistan Army Hospital.

baked in a small house a short distance from the hospital. The earthen basement housed a tandoori oven (Figure 4) and a separate room to leaven the bread. Upon assessment, it appeared that all patients received the same food quantities regardless of energy needs (Figure 5). We provided a tool to quickly calculate estimated nutrient needs that then corresponded to tray photos depicting food volume of the main staples available. We provided body measurement and nutrition physical exam recommendations to track pre- and post-admission nutritional status. I was unable to stay for the plan implementation as I was already on orders to redeploy a few days later, but I felt honored to assist just the same.

In closing, if you have an opportunity to deploy, perhaps you too can be a “jack of all trades.” Although I deployed for a

research mission, I proactively set out to use my nutrition skillset. Staying busy helped maintain my sanity and contribute to the greater good. As I reflect on my diverse—yet amazing—experiences, I am thankful for the opportunity to serve and fortunate to return home safe.

Disclaimer

Unless otherwise stated photographs are courtesy of Colonel Renee Cole.

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Expanding Role of Army Dietitians in Humanitarian Missions

MAJ Lori Maggioni, MS, RDN, LD

INTRODUCTION

On September 20, 2017, Hurricane Maria struck the north-east Caribbean, causing catastrophic damage and a major humanitarian crisis. It is regarded as the worst natural disaster on record in Dominica and Puerto Rico (PR). Maria was the third-costliest hurricane in history, with roughly \$100 billion in damages. The official death toll stands at 2975, but actual fatalities are estimated to be over 4600.¹ Immediately, governmental and nongovernmental organizations stepped in to assist with all aspects of recovery, from basic subsistence and medical care to infrastructure repair and replacement.

Army Medicine maintains a medically ready force and delivers world-class expeditionary health care across a full range of military operations, including humanitarian crises such as Hurricane Maria. Army dietitians, trained in clinical nutrition, public health, and food service management, have long served as valued health care team members and are critical resources on humanitarian missions. Their involvement in humanitarian aid and nation assistance activities dates to 1959.² Army dietitians excel at assessing the nutritional status of local populations, implementing food service relief efforts, and communicating proper food safety and sanitation to the local public.

PUERTO RICO HUMANITARIAN MISSION

14th Combat Support Hospital Mobilization

In late September 2017, the 14th Combat Support Hospital (CSH) mobilized to Humacao, PR, in support of the Defense Support to Civil Authorities (DSCA) Disaster Relief Mission. Previous DSCA missions used military personnel during natural and man-made disasters, law enforcement support, and other domestic activities normally carried out by civil authorities.³

The mission of the 14th CSH in PR was two-fold: to provide lifesaving and life-sustaining medical care and to assist the local leaders and healthcare teams operating at limited capacity to get their hospitals back up and running. The Army performed an airlift of 14th CSH personnel and equipment via 15 Boeing C17 transport aircraft to PR. The Professional Filler System (PROFIS) was used during this time to fill voids in medical staffing, a common practice when a unit deployed

on a combat or humanitarian mission. One dietitian was PROFIS to the 14th CSH to provide nutrition expertise.

Disaster response is a highly complex effort requiring superb coordination among participants.⁴ Once on site, over 200 Soldiers from the 14th CSH worked to set up the 44-bed hospital inside a basketball arena with operating room (OR), emergency room (ER), and intensive care unit (ICU) capabilities in one of the hardest hit areas of the island (Figure 1).

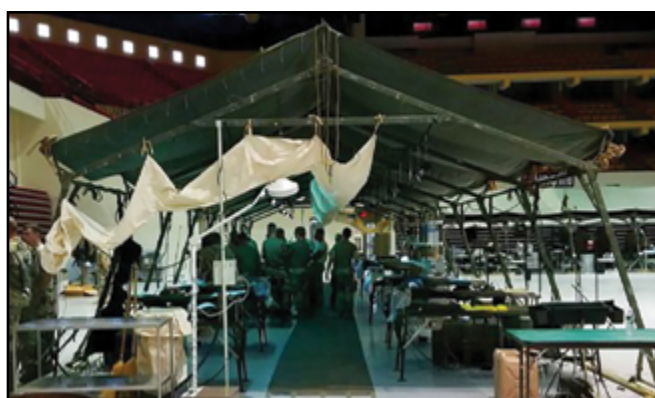


Figure 1. The 44-bed hospital was established inside a basketball arena with OR, ER, and ICU capabilities in one of the hardest hit areas of the island. Photograph courtesy of MAJ Lori Maggioni.

The 14th CSH's rapid deployment of a mobile hospital for disaster relief in a location with semi-operational local infrastructure was outstanding. During the 6 weeks after set-up, medical and surgical services were provided to over 1800 patients. At times, the eight-bed ER treated over 100 patients per day. The ability to care for patients was severely limited by poor power supply, damage to buildings and equipment, and lack of personnel, yet they succeeded despite the many challenges.

Nutrition Care Support to the 14th Combat Support Hospital

During the humanitarian mission, a team of six Nutrition Care Specialists (68Ms) led by the Army dietitian oversaw patient and soldier feeding, inpatient nutrition screening, medical nutrition therapy, and community outreach. 68Ms were utilized to the fullest capacity of their military occupational specialty during this mission. Soldiers had daily opportunities to assist the OR, ER, and ICU with translation services, IV administration, wound debridement and dressing changes, preoperative

and postoperative patient care, and patient loading and transport (Figure 2). Key to the 14th CSH's mission success was its ability to improvise and adapt to its changing situation, as exemplified by the flexibility of the nutrition care team.



Figure 2. Soldiers from the 14th Combat Support Hospital perform patient loading and transport in Humacao, PR. Photograph courtesy of Maj. Lori Maggioni.

The nutrition team served over 370 inpatient meals out of a containerized kitchen set up in the parking lot of the basketball arena turned hospital. This mobile kitchen provided flexible, efficient, rapidly deployable meal preparation capability inside a tactical trailer. In response to public health emergencies, dietitians face many unique challenges to ensure patients receive adequate nutrition support. Army dietitians are trained in adapting approaches to medical nutrition therapy to meet their patients' nutritional status needs best.

Nutrition Care in Community Outreach

Disease outbreaks and acute malnutrition are the major public health concerns in emergencies and natural disasters. Most illnesses treated during the mission were acute or chronic medical conditions exacerbated by lack of medical care, like the medical crisis after Hurricane Katrina and the earthquake in Haiti.^{5,6} Hurricane Maria destroyed nearly 80% of PR's crop value, left 60% of the island without water, and almost the entire island without power.⁷

Within the first 3 months after the Hurricane Maria, 31% of households reported disruptions to medical services, and they went an average of 84 days without electricity, 68 days without water, and 41 days without cellular telephone coverage.¹ This had a devastating impact on food security and chronic disease management. To address this, the 14th CSH nutrition team made multiple appearances on a local Puerto Rican radio station to provide food safety and sanitation advice in times of natural disaster (Figure 3). Nutrition outreach focused on at-risk population groups, including infants, pregnant or lactating women, and older people.



Figure 3. Captain Lori Maggioni, 14th Combat Support Hospital dietitian, speaking on a local Puerto Rican radio station to provide food safety and sanitation advice.

Throughout three community outreach healthcare clinics, the 14th CSH provided blood glucose monitoring, blood pressure screening, and nutrition counseling to over 150 patients in Maunabo and Yabucoa, PR. The 14th CSH offered basic mental and behavioral health counseling services. In addition to the physical harm natural disasters cause, the mental health toll can be just as devastating for families. Depression, stress, and anxiety place individuals at increased risk for loss of appetite, poor food choices, and malnutrition. These nutrition issues were magnified in the setting of food insecurity in PR's post-natural disaster environment.

Public health nutrition uses a broad-based approach to confront complex health issues. The Army dietitian worked closely with the Federal Emergency Management Agency (FEMA), the 14th CSH Chaplain, and the PR Army National Guard to coordinate humanitarian food and water delivery



Figure 4. 14th Combat Support Hospital soldiers distributed over 40,000 MREs and FEMA humanitarian food rations to local citizens most affected by Hurricane Maria. Reproduced from US Department of Defense. Photograph by Sgt. Thomas Calvert. <https://www.defense.gov/Multimedia/Photos/igphoto/2001824636/>

to dozens of local schools, churches, dialysis centers, and volunteer organizations (Figure 4). More than 200 schools, as well as shelters and senior centers, served as community feeding centers.⁷ During the humanitarian mission, over 40 000 FEMA humanitarian food rations and US Army Meals Ready-to-Eat (MREs) were distributed to local citizens most affected by the hurricane. Each MRE provides an average of 1250 calories (13% protein, 36% fat, and 51% carbohydrates) and includes a self-heating source. The MRE contents—heated or cold—can be eaten from the wrappers with the provided plastic utensils.

CONCLUSION


Dietitians improve warfighter readiness and optimize soldier performance through health and nutrition. Army dietitians also provide invaluable support in other areas as the US military is increasingly called upon to provide medical care for US forces, coalition forces, and civilian populations in operations other than war. The 2022-2023 Army Medicine Campaign Plan expresses, “In an already complex system, maintaining a global perspective that balances near-term, ongoing, and longer-term future requirements when dealing with issues such as climate change and pandemics is critical.”⁸ Army dietitians are ready and available to assist in a broad range of missions, including peace operations, humanitarian assistance, and disaster relief.

References

1. Kishore N, Marqués D, Mahmud A, et al. Mortality in Puerto Rico after Hurricane Maria. *N Engl J Med*. 2018;379(2):162-170. doi:10.1056/NEJMsa1803972
2. Applewhite MP, Standage LS, Thomas CD. The Army dietitian's role in humanitarian assistance. *J Acad Nutr Diet*. 1997;97(9):A87. DOI: 10.1016/S0002-8223(97)00627-5
3. Chairman of the Joint Chiefs of Staff. *Defense Support of Civil Authorities*. CJCS; 2018. Joint Publication 3-28.
4. Center for Law and Military Operations, U.S. *Domestic Disaster Response 2017: Hurricanes Harvey, Irma, and Maria Lessons Learned for Judge Advocates*. Center for Law and Military Operations CLAMO, The Judge Advocate General's Legal Center and School, United States Army; 2018. Accessed January 14, 2024. <https://www.loc.gov/item/2021692625/>
5. Kenney RJ. Emergency preparedness concepts for dialysis facilities: reawakened after Hurricane Katrina. *Clin J Am Soc Nephrol*. 2007;2(4):809-813. doi:10.2215/CJN.03971106
6. Cecchine G, Morgan FE, Wermuth MA, Jackson T, Schaefer AG, Stafford M. *The U.S. Military Response to the 2010 Haiti Earthquake, Considerations for Army Leaders*. RAND Corporation; 2013. RR-304-A.
7. Federal Emergency Management Agency. *Hurricane Maria Update*. FEMA; 2017. Release Number: R2 DR 4339-PR NR 023.
8. US Army Medical Command and The Office of The Surgeon General. *2022 – 2023 Army Medicine Campaign Plan*. MEDCOM; 2021.

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Fueling the Fight: The Impact of the Registered Dietitian Nutritionists on Special Operations Forces Personnel

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ABSTRACT

Registered dietitian nutritionists (RDNs) have a short but rich and burgeoning history of working in the special operations community. Similar to sports dietitians in collegiate and professional settings, RDNs serving in special operations work in a holistic manner alongside other medical and nonmedical counterparts with the goals of achieving optimal performance, reducing rehabilitation and recovery time, and extending the longevity of special operations forces personnel. To date, most performance dietitians serving in special operations forces elements at the battalion- or group-level and below are Department of the Army Civilians (DACs) and contractors. DACs and contract registered dietitian nutritionists work directly with individual and unit personnel in selection, training, and garrison environments. Active-duty Army registered dietitian nutritionists (ARDNs), in contrast, typically serve in leadership positions at the enterprise-level focusing on policies, programs, and synergy across special operations forces formations. These ARDNs have served or are currently serving at the 75th Ranger Regiment and US Army Special Operations Command. This commentary provides a brief history of RDNs in special operations with particular focus on the roles, responsibilities, and impacts of ARDNs on the special operations community. In particular, ARDNs have worked across the Department of Defense and other agencies to inform and shape policy on performance enhancing substances, Warrior Restaurant menu standards and guidelines, and commercial off-the-shelf nutritional products. Additionally, they have performed research to inform practices, programs, and policies, worked to increase the basic daily food allowance to meet the augmented nutrition needs of special operations forces personnel, provided medical nutrition therapy oversight, and given input for ration development tailored to the special operations mission. RDNs have made a profound impact on the special operations forces mission by working collaboratively to enhance nutrition quality and modernize feeding strategies to gain and maintain a competitive advantage now and into the future.

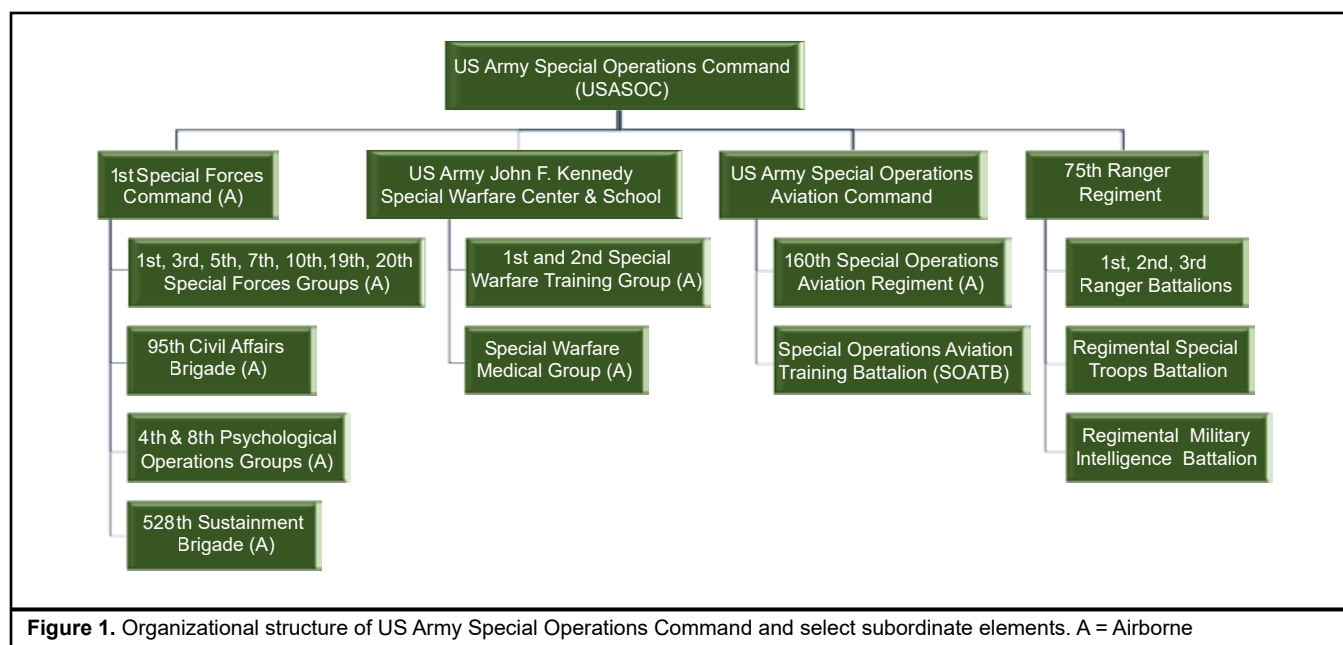
Registered dietitian nutritionists (RDNs) have served in special operations for more than a decade and made a substantial positive impact on programs, policies, and fueling strategies aimed at gaining and maintaining a competitive advantage now and into the future. This commentary provides an account of the roles and responsibilities of RDNs working in special operations and highlights areas where their efforts have modernized and enhanced the quality of and access to optimal nutrition.

United States Army Special Operations Command (USASOC) is the Army component of the US Special Operations Command (USSOCOM). USASOC generates and sustains Army special operations forces to conduct worldwide missions. USASOC is comprised of the 1st Special Forces Command (Airborne), US Army Special Operations Aviation Command, US Army John F. Kennedy Special Warfare Center & School, and the 75th Ranger Regiment, as well as various sub-elements (Figure 1).

SOF personnel have greater nutritional needs than conventional force counterparts due to the physiological demands imposed during special operations training and missions.¹ Suboptimal nutrition results in declining body composition and is associated with decreases in physical and cognitive performance.² As such, RDNs play a critical role in achieving and sustaining performance across a range of special operations settings and are valued members of the human performance teams supporting SOF personnel.

SELECTION AND TRAINING OF ARMY RDNS IN SPECIAL OPERATIONS

Army RDNs (ARDNs) complete specialized training prior to serving in special operations. At a minimum, the RDNs must be a Certified Specialist in Sports Dietetics (CSSD). Most ARDNs also complete training with industry, either



at the Olympic Training Centers in Colorado Springs, Colorado, and Lake Placid, New York, or at the US Military Academy, West Point, New York, to gain additional experience with athletes prior to assuming a position in special operations. If not already Airborne qualified, ARDNs assigned to SOF units complete US Army Airborne School.

ARDNs are afforded additional opportunities to attend rigorous military courses within special operations. To date, two ARDNs have completed US Army Ranger School, opening the door for others to follow. LTC Nick Barringer (then CPT Barringer) was the first ARDN to complete Ranger School in 2007, and CPT Megan Kwon became the first female Army Medical Specialist Corps officer and second ARDN to earn the Ranger tab in 2021. Ranger School provides a firsthand experience to the physical demands, effects of food and sleep deprivation, and mental stressors of complex tactical situations often faced by SOF personnel. The lessons learned by attending advanced selection courses, like Ranger School, expand the human performance knowledge and tactical experience of the ARDN.

ARDNs serving in the 75th Ranger Regiment must first pass the Ranger Assessment and Selection Program II (RASPII). RASPII is for soldiers in the rank of Staff Sergeant and above and all officers volunteering for assignment to the 75th Ranger Regiment. This course assesses the suitability of mid- and senior-grade leaders for assignment to the Regiment and teaches the operational techniques and standards of the Ranger Regiment. RASPII also provides training in special tactics, equipment, and missions that make the Regiment unique. Upon

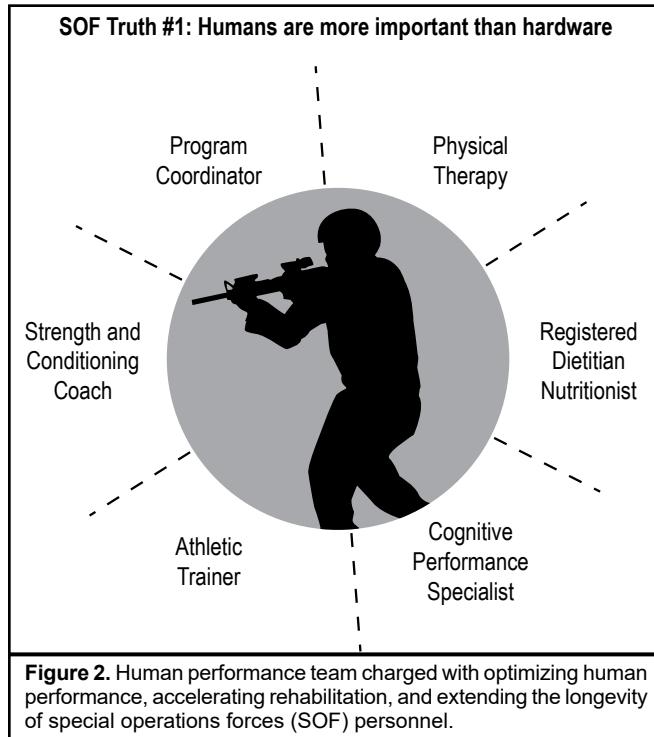
completion of RASPII, applicants are assigned to the 75th Ranger Regiment.

Others have completed additional specialized military training prior to serving in specific deployment capacities. The specialized training includes a multiweek selection process followed by 3 months of rigorous cultural, patrolling, tactical questioning, physical, and convoy operations training, as well as training to operate various weapons systems to serve as a Cultural Support Team leader. Other specialized training includes Survival, Evasion, Resistance, and Escape (or SERE) school, where students learn critical skills to survive and return home in the event a soldier becomes isolated from their unit in enemy territory or captured by hostile forces. Collectively, these instances highlight the vast range of qualifying and specialized rigorous training ARDNs experience in special operations.

ARMY RDN ROLES IN SPECIAL OPERATIONS

RDNs serve in several capacities throughout USASOC. Most RDNs are Department of the Army Civilians (DACs) or contracted employees. DAC and contracted RDNs work at the group- or battalion-level and below and provide nutrition education and training for groups and individuals. RDNs working in special operations serve alongside other human performance and rehabilitation personnel to promote and sustain optimal performance, support recovery and rehabilitation, and extend the longevity of SOF personnel (Figure 2). DAC and contracted RDNs also work collaboratively with special operations Warrior Restaurant (formerly known as dining facilities) teams to

ensure performance-based options are available to enhance the nutrition environment.



ARDNs work at the strategic level and serve in positions at USASOC Headquarters and the 75th Ranger Regiment. The ARDN at USASOC functions as the Command Performance Dietitian and Nutrition Consultant for USSOCOM. In this capacity, the ARDN advises the USASOC Commanding General, the Command Surgeon, and the Human Performance & Wellness Director on nutrition standards, education, and research pertaining to performance and clinical nutrition. The ARDN also serves as a liaison for USASOC and USSOCOM with Department of Defense (DoD) agencies, executive departments, interagency, public and private organizations and agencies to include the Office of the Under Secretary of Defense for Personnel and Readiness, Defense Health Agency, Uniformed Services University, Combat Capabilities Development Command, Defense Logistics Agency, Joint Culinary Center of Excellence, the U.S. Army Research Institute of Environmental Medicine, and Training and Doctrine Command. At the USASOC (Army Service Component Command) and USSOCOM (Combatant Command) levels, the ARDN ensures integration of nutrition efforts with the Surgeon, Preservation of the Force and Family / Human Performance & Wellness, J4 / G4 Logistics, and Acquisition, Technology, and Logistics. In a leadership capacity, the ARDN facilitates a collaborative community of practice of over 40 DAC and contracted RDNs with performance specialties across the enterprise to champion initiatives, inform

policies, and share best practices. The goal of this group is to enable SOF personnel to gain and maintain a competitive advantage now and into the future.

Similarly, the ARDN serving at the 75th Ranger Regimental was the primary nutrition and performance consultant to the Regimental Command and over 3700 Rangers. To date, the only ARDN to fill this position as a directed military overstrength was LTC Nick Barringer (CPT Barringer then). He developed, implemented, and managed comprehensive nutrition programs for each of the three Ranger Battalions. Additionally, he researched, developed, published, and promoted policies, programs, and practices directed toward the prevention of nutrition related disease, illness, and injury.

In addition to providing nutrition-related leadership, ARDNs served as key members of the teams that developed Human Performance Programs that ultimately served as models for the modern-day Holistic Health and Fitness Program. Specifically, LTC Barringer was instrumental in the development of the Ranger Athlete Warrior program at the 75th Ranger Regiment, and LTC Daigle (then CPT Daigle) was critical to the creation of the Tactical Human Optimization, Rapid Rehabilitation, and Reconditioning (THOR3) program at USASOC.

IMPACT OF THE ARMY RDN IN SPECIAL OPERATIONS

ARDNs working in special operations have made a significant impact on the special operations community by contributing to research that informs practices, programs, and policies, mediating an increase in the basic daily food allowance (BDFA) and subsequently writing policy to improve the Warrior Restaurant menu standards and guidelines, informing and shaping policy on performance-enhancing substances and commercial off-the-shelf nutritional products, providing medical nutrition therapy oversight, and giving input for ration development tailored to the special operations mission.

Research

ARDNs in special operations have conducted research pertaining to the nutritional and recovery needs of SOF personnel during training^{1,3} and deployment.⁴ Results from these studies have established areas of emphasis to optimize recovery following rigorous training and identified the mismatch between caloric intake and energy expenditure during training and deployment. ARDNs have also provided empirical data to determine the likelihood of success in SOF tasks using assessments of performance metrics.⁵ These data may inform strength and conditioning professionals during physical fitness program development. ARDNs have also researched nutritional interventions to improve cognitive protection, which is threatened by duty hazards experienced during special operations missions.⁶

Basic Daily Food Allowance

The BDFA is the amount of money authorized for Warrior Restaurants to provide nutritionally adequate sustenance to soldiers and patrons for the period of one day.⁷ The BDFA is distributed by the Joint Culinary Center of Excellence and is set to meet the needs of a sample representative of 10% of the average daily headcount.⁷ However, studies have demonstrated higher energy expenditure for SOF personnel in garrison and in training compared with non-SOF military counterparts.¹ Since maintaining energy balance is essential for physical performance, Army SOF (ARSOF) commanders approved an increase to the BDFA to meet these increased needs. As of 2002, however, commanders were no longer able to locally approve an increase to the BDFA. A 2003 analysis by USASOC G4 (Logistics), outlined literature supporting the increased energy needs of SOF personnel and recommended Headquarters, Department of the Army G4 approve a 40% increase to the BDFA. From 2003 to present, ARSOF commanders, researchers, performance RDNs, and food service personnel have dedicated substantial effort to retain, validate, and continue to justify the requirement for supplemental funding to the BDFA for SOF. In 2012, the SOF supplemental BDFA was in jeopardy. At the request of RDNs working in special operations, the US Army Research Institute of Environmental Medicine (USARIEM) conducted a study that validated SOF personnel expend 114 to 160% more energy⁸ than the Military Dietary Reference Intake outlined in Army Regulation 40-25.⁹ Stakeholders successfully campaigned for a minimum increase of 25% supplemental BDFA to meet these increased energy and nutrient requirements. However, simply providing more food or more costly food, or both, without ensuring it is performance based does not fully meet the intent to optimize performance of SOF personnel, so this emphasis remains a continual effort of RDNs working in SOF.

Performance-Based Menu Standards and Guidelines

In 2012, RDNs in special operations developed the first SOF Menu Standards to communicate how SOF Warrior Restaurants would use the supplemental BDFA. These standards, based on the Olympic Training Center menu standards, promoted greater variety of performance-enhancing foods and labeling of high-quality foods and beverages to optimize performance and health. The ARDNs, along with DAC and contracted RDNs, working in special operations revised the initial menu standards ensuring they reflected the latest science and either met or exceeded military food-service requirements, and obtained an exception to policy for the standards that did not support performance. The ARSOF Policy 7-18, signed in 2018, provided the menu standards and guidelines for execution at all 14 USASOC Warrior Restaurants. This policy details standards for menu planning, food procurement, preparation, meal service and the Gold Standard Assessment—an

evaluation process for ensuring adherence to policy standards. It also addresses nontraditional meal options, such as boxed meals. Since 2019, USASOC has objectively had the highest scoring food program in the Army, a testament to the importance of engaged leaders and the impact of RDNs on the military food program.

Performance Enhancing Substances

Nutritional supplements can play an important role in achieving peak performance, particularly when needs are not met by whole foods alone. However, due to insufficient enforcement of dietary supplement regulations, DoD-prohibited ingredients may taint products and adversely impact performance or cause harm. With assistance from the ARDN, USSOCOM developed and implemented Performance Enhancing Substance (PES) Policy Memorandum 19-30. The policy provides guidance aimed at decreasing the potential for adverse events. This demonstrates the value of an ARDN in a strategic position as an enabler of rapid change and progress. Subsequent to USSOCOM's implementation of the PES Policy, the DoD published similar regulatory guidance¹⁰, demonstrating the far-reaching impact of the ARDN.

Commercial Off-The-Shelf Nutrition Products

Unlike many collegiate programs where fueling stations abound, performance RDNs in special operations must develop creative solutions to meet the increased energy and nutrient requirements of SOF personnel. As a component nutrition consultant to USSOCOM, the ARDN developed and facilitated the Commercial-Off-The-Shelf (COTS) Nutrition Products Policy Memorandum 19-16 to bridge the energy-deficit gap and provide high-quality performance foods for SOF personnel pre-, during-, and post-activity. A proposed revision of the USSOCOM COTS Nutrition Products incorporates nutrition and logistical considerations for extreme environments (hot, humid, arctic) and special populations (underwater, aviators) to better meet end-user needs.

Medical Nutrition Therapy Oversight

The ARDN also provides discipline-specific medical oversight for RDNs working in USASOC. In this capacity, the ARDN supports the credentialing, privileging, and clinical quality management of performance RDNs. In 2019, the ARDN developed and implemented the USASOC Performance Dietitian Peer Review Process Policy 8-20 to evaluate consistent application of the Nutrition Care Process, a systematic approach to providing high-quality nutrition care, outlined by the Academy of Nutrition and Dietetics. This policy, developed by the ARDN, served as a template for the Holistic Health and Fitness (H2F) Ongoing Professional Performance Evaluation Process (in staffing) that encompasses all human performance medical professionals. In 2021, the Lab Work Authorized for Performance Dietitians Policy 21-09 was implemented to

clarify the appropriate use of laboratory tests by performance RDNs. This policy empowered performance RDNs to function more proactively within their scope of practice.

Ration Development

In 2019, the DoD Combat Feeding Directorate conducted a capabilities-based assessment. This process brought together stakeholders to identify capability gaps and create innovative solutions to provide optimal nutrition for service members. It has been well documented that the SOF personnel have a greater energy expenditure than conventional soldiers^{1,8} leading to undesired energy deficits and loss of body mass. Therefore, the ability to accurately estimate daily energy requirements would be useful for accurate logistical planning. Purpose: Generate a predictive equation estimating energy requirements of SOF. Methods: Retrospective analysis of data collected from SOF personnel engaged in 12 different SOF training scenarios. Energy expenditure and total body water were determined using the doubly-labeled water technique. Physical activity level was determined as daily energy expenditure divided by resting metabolic rate. Physical activity level was broken into quartiles (0 = mission prep, 1 = common warrior tasks, 2 = battle drills, 3 = specialized intense activity and thus need additional calories and nutrients in a lightweight, low-volume package to enable tactical maneuverability. With input from special operations ARDNs, the Combat Feeding Directorate is developing the Modular Operational Ration Enhancement Performance Pack to meet the increased calorie needs of the SOF population.¹¹

DEPLOYMENT

ARDNs have deployed in traditional and nontraditional roles in support of special operations' missions. Those deploying in a traditional capacity have conducted battlefield circulations to assess dietary intake, nutritional quality, provide education, and remedy issues related to accessing foods and supplements. In nontraditional roles, ARDNs have deployed as a cultural support team leader to perform village stability operations, conduct outreach to the local populace, and gather actionable battlefield intelligence; as a medical operations officer for the Joint Special Operations Task Force to plan evacuations and coordinate medical care and casualty transportation and tracking of SOF personnel; and to conduct foreign internal defense operations to train, advise, and mentor female Afghanistan partner forces. ARDNs have also deployed with special operations units to conduct research aimed at determining nutrition needs of SOF personnel during deployment and informing policy and ration development.

CONCLUSION

The presence of ARDNs in special operations has been short but impactful. Their ability to work as a team and

collaborate with commanders and outside agencies has allowed them to develop and implement evidence-based nutritional guidance and policies that promote optimal performance, accelerate recovery, and extend the longevity of SOF personnel. ARDNs in special operations will continue to enhance nutrition quality, modernize feeding strategies, and meet emerging food and nutrition requirements for the world's most elite fighting force.

Acknowledgments

The authors would like to thank all of the leaders, past and present, that advocated for assignment of RDNs in special operations and support human performance and wellness professionals with the aim of providing proactive, active, and reactive solutions for SOF personnel. We would also like to thank the DA civilian and contracted RDNs that work diligently with human performance teams and end users. Your energy, enthusiasm, and acumen in your field is unparalleled. Most importantly, we want to thank the SOF Warfighters for which we serve.

References

1. Barringer ND, Pasiakos SM, McClung HL, Crombie AP, Margolis LM. Prediction equation for estimating total daily energy requirements of special operations personnel. *J Int Soc Sports Nutr*. 2018;15:15. doi:10.1186/s12970-018-0219-x
2. O'Leary TJ, Wardle SL, Greeves JP. Energy deficiency in soldiers: The risk of the athlete triad and relative energy deficiency in sport syndromes in the military. *Front Nutr*. 2020;7:142. doi:10.3389/fnut.2020.00142
3. Konkright WR, Barringer ND, Lescure PB, Feeney KA, Smith MA, Nindl BC. Differential recovery rates of fitness following U.S. Army Ranger training. *J Sci Med Sport*. 2020;23(5):529-34. doi:10.1016/j.jsams.2019.12.010
4. Konkright WR, Barringer ND, McClung J. Mission profile characteristics of a special forces deployment in Afghanistan. *Int J Exerc Sci*. 2019;9(7).
5. Barringer ND, McKinnon CJ, O'Brien NC, Kardouni JR. Relationship of strength and conditioning metrics to success on the Army Ranger Physical Assessment Test. *J Strength Cond Res*. 2019;33(4):958-64. doi:10.1519/JSC.0000000000003044
6. Barringer N, Konkright W. Omega-3 fatty acid ingestion as a TBI prophylactic. *J Spec Oper Med*. 2012;12(3):5-7. doi:10.55460/E1W8-7PLC
7. US Army. Army Regulation 30-22, Army Food Program Washington, DC: Department of the Army; 2019. Available from: https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN7458_R30_22_FINAL.pdf
8. Margolis LM, Crombie AP, McClung HL, et al. Energy requirements of US Army Special Operation Forces during military training. *Nutrients*. 2014;6(5):1945-55. doi:10.3390/nu6051945
9. US Army. Army Regulation 40-25, OPNAVINST 10110.1/MCO 10110.49, AFI 44-141. Nutrition and Menu Standards for Human Performance Optimization. Washington, DC: Headquarters Department of the Army, the Navy, and the Air Force; 2017. Available from: https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/AR40-25_WEB_Final.pdf
10. Department of Defense. *Department of Defense Instruction 6130.06, Use of Dietary Supplements in the DoD*. Washington, DC: Office of the Under Secretary of Defense for Personnel and Readiness; 2022. Available from: <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/613006p.pdf>

11. Combat Rations Database (ComRAD) | Human Performance Resources by CHAMP. Accessed April 27, 2022. <https://www.hprc-online.org/nutrition/comrad#6>

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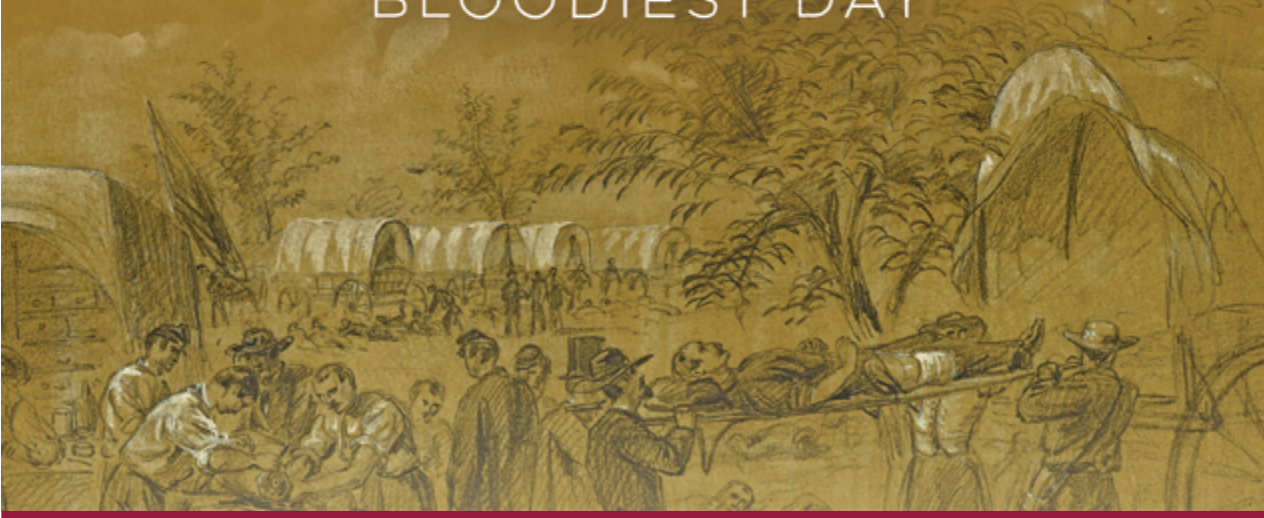
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A History of Excellence in Entry-level Education: Dietitian, Occupational Therapy, Physical Therapy, and Physician Assistant Training Programs in the US Military

COL Renee E. Cole, SP USA; LTC Carrie W. Hoppes, SP USA; LTC Margaret M. Kucia, SP USA;
COL Enrique V. Smith-Forbes, SP USA

INTRODUCTION

The Army Medical Specialist Corps (AMSC) is comprised of Registered Dietitian Nutritionists (RDNs), Physical Therapists (PTs), Occupational Therapists (OTs), and Physician Assistants (PAs). Most of these officers are trained in the US military's entry-level programs, first established to produce reconstruction aides to care for those injured during World War I.¹ The OT and PT professions emerged from the need to rehabilitate injured service members for return to duty or civilian roles, while the RDN profession emerged during the war to provide food service and patient feeding. The PA profession was necessary to supplement physicians and surgeons and complemented the military medical mission in meeting the unique healthcare needs of service members. As the professions evolved, the training programs have also grown from 120-day certificate programs (physical therapy) to master's degree (dietitian and physician assistant) and doctoral degree (occupational and physical therapy) programs.

UNIQUE SKILLSETS OF AMSC OFFICERS

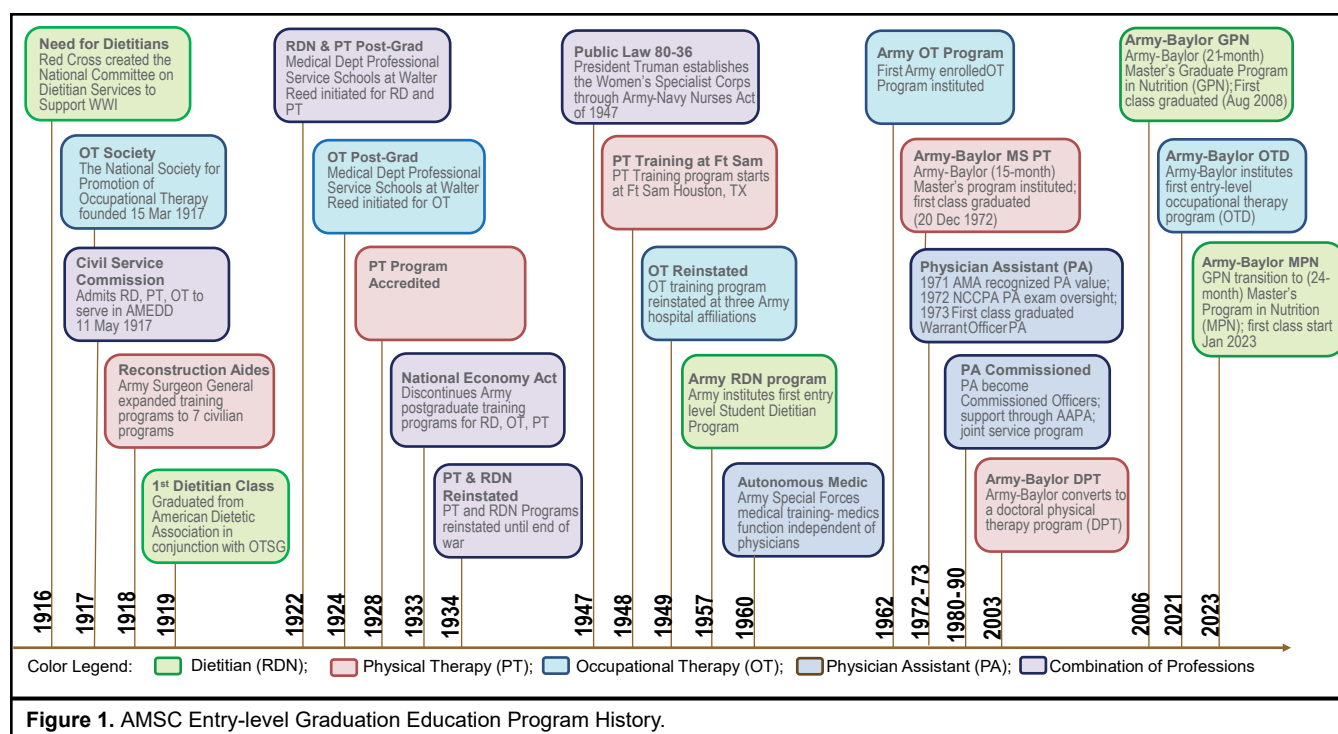
Army Medical Specialist Corps officers have unique skillsets with requisite training to become competent in delivering military health care. Army PTs, OTs, RDNs, and PAs complete formal training through similar graduate-level coursework as their civilian counterparts, must meet the same national accreditation standards as their civilian counterparts, and must obtain professional registration or licensure upon graduation to remain in the AMSC. In contrast to their civilian counterparts, military PTs and OTs are able to order imaging and laboratory studies; prescribe certain analgesics, muscle relaxants, and nonsteroidal anti-inflammatory medications; place patients on work/duty restrictions; and refer patients to specialty medical clinics.²⁻⁶ Army RDNs are expected to be a one-stop shop for nutrition, managing food service, and medical nutrition

therapy in the traditional settings.⁷ However, Army RDNs must also be independent, self-sufficient clinicians in the combat, humanitarian, and stability operational settings to address nutritional needs regardless of patient acuity and are also the gatekeeper of military nutritional fitness in a health-prevention role.⁸⁻⁹ Army PAs operate in diverse, resource-limited, austere environments as senior medical providers. Much of an Army PA's skillset emphasizes improving survivability of battlefield injuries, in addition to providing comprehensive soldier and family health care in partnership with interprofessional health care teams and working with commanders at all echelons.¹⁰ Thus, all four AMSC professionals exceed national expectations of an entry-level clinician.

Although the AMSC military entry-level programs are unique, there are many similarities among them. All aim to produce clinicians that are competent in delivering evidence-based care to Military Health System beneficiaries. They also aim to produce capable officers who lead in combat support and combat service support roles. It is this dual professional role (clinician and officer) that distinguishes the military's entry-level training programs from other national programs with a demonstrated track record of excellence. This commentary describes the evolution of graduate education in the AMSC, highlights the current format of the programs, and discusses their successes and future direction.

EVOLUTION OF AMSC ENTRY-LEVEL TRAINING PROGRAMS

All except for the Interservice Physician Assistant Program (IPAP) were created in response to health care needs during World Wars I and II, and each training program has evolved along with its respective profession. Figure 1 provides a historical depiction of the transformation from civil service to the current military entry-level educational programs.^{1,11-12} Both



physical therapy and dietitian civil service programs began at the Army Medical Department Professional Service School at Walter Reed in 1922; however, it was not until 1947 and 1957 that the Army implemented its physical therapy and dietetic internship programs, respectively. The occupational therapist program followed in 1962 with the physician assistant program completing the training course offerings for the AMSC in 1973.

In 1971, the Army physical therapy program partnered with Baylor University to offer a Master of Physical Therapy (MPT) degree, which transitioned to a Doctor of Physical Therapy (DPT) degree in 2003 and graduated the first class of doctorally prepared students in 2006. From 2006-2010, Baylor University offered a Transitional Doctor of Physical Therapy (tDPT) program to MPT graduates. Eight cohorts totaling 125 officers took advantage of this program. Following this successful transition, 369 officers earned their DPT degree between 2006 and 2021.¹³

In 2006, the Army once again partnered with Baylor University to expand the traditional 9-month dietitian internship program into a 21-month US Military-Baylor University Graduate Program in Nutrition (GPN). The GPN is a master's degree program that included Air Force students for a brief time (2010-2015) and graduated 140 Army RDNs through 2021. Beginning in January 2023, the GPN will reorganize into the Master's Program in Nutrition (MPN), converting from a 2-phased, 21-month program with separate didactic and clinical rotations into a 24-month coordinated program.¹⁴ The

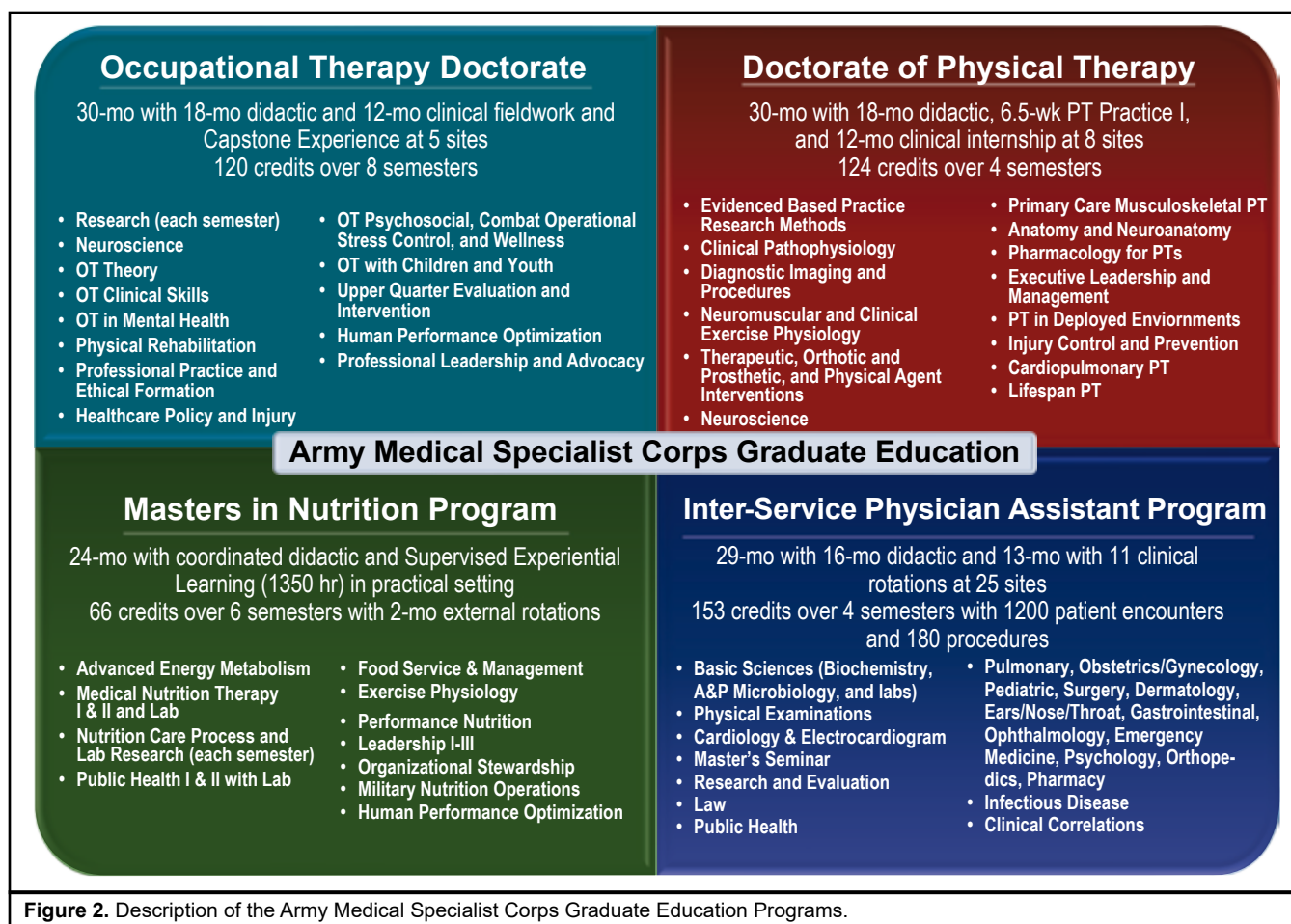
MPN student will complete experiential, supervised practice rotations while simultaneously completing the didactic coursework.

The Army OT 1-year internship program allowed candidates to complete their civilian degrees as Army OT officers and was discontinued in 2009. The Army also assessed fully credentialed OT clinicians with a bachelor's degree until 2007 and transitioned to a master's degree in occupational therapy. In 2021, the Army-Baylor Occupational Therapy Doctorate (OTD) Program was established. The first OTD class is expected to graduate in 2024.¹⁵

The IPAP originated in 1996 by consolidating three separate Army, Navy, and Air Force programs to overcome physician shortages and ensure a standardized PA education that met national accreditation standards.¹⁶ In keeping with national standards in PA education, graduates of the IPAP earn a master's in physician assistant studies through the University of Nebraska Medical Center. The IPAP continues to be the world's largest PA program, with 200 interservice graduates per year.¹⁷

CURRENT FORMAT OF AMSC ENTRY-LEVEL TRAINING PROGRAMS

The MPN, DPT, and OTD students commission as active-duty officers prior to beginning graduate coursework, whereas IPAP only accepts those currently serving in the military regardless of branch or rank. The MPN, DPT, OTD,



and IPAP curricula for each of these programs, founded on national professional accreditation standards¹⁸⁻²¹, incorporates the unique military skillset requirements needed to meet the military's mission as well as the clinical accreditation and affiliated university standards (Figure 2). Each graduate program includes a combination of didactic graduate-level courses in conjunction with clinical practice to acquire and demonstrate the knowledge, skills, and attributes required for each profession. Although the MPN, DPT, OTD, and IPAP programs are sponsored by a civilian academic institution, didactic education occurs at the US Army Medical Center of Excellence (MEDCoE) at Fort Sam Houston, Texas, with the clinical skillset developed at a variety of military and civilian hospital-based training sites across the United States.

Additionally, the AMSC graduate programs lead the way and serve as a model for multiservice integration. The AMSC trains other military services through their programs, much like the interoperability of the Defense Health Agency. The concepts of interservice and interprofessional framework models are embedded in the current Army Operating Concept and Future Concept for Medical Operations.

Furthermore, the AMSC graduate education faculty and students support professional scholarship and advancement of Army Medicine through research. The specific research requirements vary by program; however, projects align with the AMSC-specific research lines of effort. Research supports prevention, treatment, and rehabilitation of combat and noncombat injury and illness, interprofessional healthcare delivery, and health performance optimization. Faculty and students annually present results of their scholarly activities at military and national forums and publish in peer-reviewed journals contributing to the larger scientific community.

AMSC ENTRY-LEVEL TRAINING PROGRAM SUCCESSES

One may ask why the Army chooses to “home-grow” military-specific clinicians as opposed to hiring civilian providers in their medical treatment facilities. The AMSC requires officers who think critically and decisively in environments distinct from civilian counterparts and whose skills begin with rigorous graduate education programs conducted uniquely within the military setting. The

AMSC graduate education programs answer the strategic question of how to recruit and retain specialized, technical Army professionals through nationally accredited, entry-level programs that also grant a graduate-level degree from a high-quality academic organization.²² Although the unique MPN, DPT, OTD and IPAP programs are military entry-level programs, students train for immediate military medical leadership roles, as intermediate-to-advanced practice clinicians, and are prepared with the expectation to function with autonomy in austere environments, a skillset not necessarily attained at civilian institutions.

All four AMSC programs have exceptional outcome metrics. Metrics vary by program but include high graduation rates, national examination scores, first-time licensure pass rates, and national ranking. The DPT Program ranked 13 out of 239 schools nationwide by US News & World Report.²³ The IPAP ranked 10 out of 170 schools nationwide by US News & World Report.²⁴ The GPN Program graduates annually score above the 95th percentile on the RDN registration exam with a 100% first-time pass rate when compared to the national cohort (data not publicly available). Thus, the AMSC programs recruit high-caliber students from the civilian sector that have a proclivity for military service and a desire for continued leader development. The programs are competitive but provide an avenue for equitable inclusion into these careers that contributes to a diverse pool of Army medical professionals.

Although the AMSC prefers to “home-grow” their clinicians to ensure adequate inculcation into the Army and development of strong leadership skills, the Army annually augments a fraction of its force through fully qualified clinicians sought from the civilian sector for direct accession commissioning. These newly commissioned officers face a steep learning curve and require additional training to acquire the unique medical military and leadership skillset necessary to succeed in the Army, regardless of the mission or operational environment. Once on Active Duty, these new officers may require a variety of courses to strengthen their current capabilities to include neuromusculoskeletal and vestibular care, combat operational stress control, operational field nutrition, and emergency medicine refreshers. Faculty of the MPN, DPT, OTD, and IPAP programs typically conduct these skill-developing courses.

FUTURE DIRECTIONS OF AMSC ENTRY-LEVEL TRAINING PROGRAMS

The AMSC entry-level education programs continue to evolve with evidence-based practice, with changes to national accreditation standards, and in support of military initiatives. The AMSC programs lean forward to understand and accommodate the Army Futures Command Concept for Army Medicine 2028 and beyond. They

address the knowledge and skills needed to proactively maintain a medically ready force, as well as promptly address injuries to rehabilitate and return soldiers to duty in any operational environment.

Beyond maintaining the competencies required to meet national accreditation standards, the programs consider educational content to sustain military-relevant requirements, such as those needed for the Army’s Holistic Health and Fitness System.²⁵ The GPN, DPT, and OTD faculty collaboratively created a new 3-credit Human Performance Optimization course in which graduate students from the three programs will come together to engage in small-group learning. The course facilitates a multi-disciplinary team approach to evaluate military operational unit tasks, missions, and capabilities; determine the internal and external capabilities available; analyze micro- and macro-level health, deployability, and performance data; and conduct clinically- and military-relevant tasks to optimize the health and fitness of the soldier population within the operational environment.

Additionally, the AMSC graduate education programs incorporate Army Futures Command concepts. The AMSC clinician must prepare to manage casualties within a variety of environments, such as those resulting from weapons of mass destruction, multi-domain operational conflicts, regional insurgencies, near-peer or peer competitors, and cyber and space conflicts.²⁶ The PA is the first line of care and can expect to support prolonged field care within these future battlefield environments. Tactical combat casualty care and nonbattlefield treatment in the austere environment remain an important focus for the PA.

All AMSC clinicians can expect new challenges in managing injuries from novel forms of weaponry (eg, lasers, rail guns, advanced energetics).²⁶ Management of burns and competence in acute care will be paramount. An increased prevalence of head, neck, and upper-extremity wounds are anticipated with air-based (fixed, rotary-wing, and unmanned aircraft) versus ground-based (vehicle- and house-borne improvised explosive devices) munitions dominating future conflicts. Effectiveness to maintain the fighting strength will rely on how well AMSC clinicians adapt to and overcome barriers associated with such complex challenges. Each entry-level graduate program must reassess and incorporate revisions to operational guidance into future military-specific curricula.

CONCLUSIONS

The AMSC graduate education programs were born out of a need to manage casualties during World Wars I and II. The AMSC entry-level training programs not only meet foundational national accreditation standards but also are uniquely suited to train RDNs, PTs, OTs, and PAs

to meet the health care needs of service members. These educational programs recognize the value of maintaining a medically ready military force with clinicians who can deploy at any time to any operating environment. They train students to prepare for large scale combat operations and multi-domain operations, which are concepts requiring joint operations with the understanding of novel injuries from new weapons. Additionally, the programs collaborate to facilitate preventive care through a multi-disciplinary team concept derived with the Holistic Health and Fitness system to ensure a medically ready fighting force. Over the past century, the AMSC entry-level graduate programs have grown in size, scope, and national renown. In the next century, these programs will continue to adapt to national accreditation standards and transform with the ever-changing military medical mission.

References

- Hartwick AN. *The Army Medical Specialist Corps. The 45th Anniversary*. Center of Military History. US Army: Washington, DC. 1993. Accessed May 5, 2022. https://history.army.mil/html/books/085/85-2/CMH_Pub_85-2.pdf
- Greathouse DG, Schreck RC, Benson CJ. The United States Army physical therapy experience: evaluation and treatment of patients with NMSK disorders. *J Orthop Sports Phys Ther*. 1994;19(5):261-266. doi:10.2519/jospt.1994.19.5.261
- APTA. A perspective: Exploring the roles of physical therapists on primary care teams. 2017;21:1-33. Accessed July 4, 2022. <https://www.apta.org/your-practice/practice-models-and-settings/primary-care/exploring-roles-of-pts-in-primary-care>
- Greathouse DG, Harada ND, Lee AC, Young B. Primary care team: now and beyond in physical therapy. In: Boissonnault W, ed. *Primary Care for the Physical Therapist: Examination and Triage*. 3rd ed. St. Louis, MO: Elsevier Saunders; 2020.
- Jenik CA, Protzman RR, McKennett D. The Army occupational therapist as an orthopaedic health care extender. *Mil Med*. 1984;149(7):383-8. doi:10.1093/milmed/149.7.383
- Amaker RJ, Brower KA, Admire DW. The role of the upper extremity neuromusculoskeletal evaluator at peace and at war. *J Hand Therapy*. 2008;21(2):124-9. doi:10.1197/j.jht.2007.10.011
- Stankorb SM, Ramsey C, Clark H, Osgood T. Provision of nutrition support therapies in the recent Iraq and Afghanistan conflicts. *Nutr Clin Pract*. 2014;29(5):605-11. doi:10.1177/0884533614543329
- Story KL, Bukhari AS, Bovill M. Roles of the military dietitian in combat operations and humanitarian assistance-professional development and utilization. *Mil Med*. 2016;181(10):1363-69. doi:10.7205/MILMED-D-15-00509
- Troncoso MR, Jayne JM, Robinson DJ, Deuster PA. Targeting nutritional fitness by creating a culture of health in the military. *Mil Med*. 2021;186(3-4):83-6. doi:10.1093/milmed/usaa325
- Chalupa RL, Marble WS. A history of US Army PAs. *JAAPA*. 2017;30(11):39-43. doi:10.1097/01.jaa.0000525910.74978.89
- Hodges PA. Perspectives on history: military dietetics in Europe during World War I. *J Am Diet Assoc*. 1993;93(8):897-900. doi:10.1016/0002-8223(93)91529-y
- Hodges PA. Perspectives on history: Army dietitians in the European, North African, and Mediterranean theaters of operation in World War II. *J Am Diet Assoc*. 1996;96(6):598-601. doi:10.1016/S0002-8223(96)00164-2
- Baylor University. Military-Baylor Graduate Programs: Physical Therapy (DPT). Waco, TX: Baylor University, Robbins College of Health and Human Sciences. <https://www.baylor.edu/graduate/pt/>
- Baylor University. Military-Baylor Graduate Programs: Nutrition (MS). Waco, TX: Baylor University, Robbins College of Health and Human Sciences. <https://www.baylor.edu/graduate/nutrition/>
- US Army Medical Center of Excellence. US Army Occupational Therapy Doctoral (OTD) Program. Fort Sam Houston, TX: US Army Medical Center of Excellence. <https://medcoe.army.mil/graduate-school-otd/>
- Harrison RS, Adamson KJ, Kroger SM. The Interservice Physician Assistant Program: Education quantity and quality. *JAAPA*. 2015;28(12):56-61. doi:10.1097/01.JAA.0000473366.15469.0b
- US Army Medical Center of Excellence. Interservice Physician Assistant Program. Fort Sam Houston, TX: US Army Medical Center of Excellence. <https://medcoe.army.mil/ipap>
- Commission on Dietetic Registration. <https://www.cdrnet.org>
- Commission on Accreditation in Physical Therapy Education. <https://www.captconline.org>
- Accreditation Council for Occupational Therapy Education. <https://acoteonline.org>
- Accreditation Review Commission on Education for the Physician Assistant (ARC-PA). Suwanee, GA: ARC-PA. <http://www.arc-pa.org>
- Cunningham S. *Key Strategic Issues List (KSIL): Academic Years 2021-2022*. Carlisle Barracks, PA: US Army War College Press; 2020. Accessed July 4, 2022. <https://press.armywarcollege.edu/monographs/906>
- U.S. News & World Report. Best Physical Therapy Programs in 2020. Accessed July 4, 2022. <https://www.usnews.com/best-graduate-schools/top-health-schools/physical-therapy-rankings?name=army>
- U.S. News & World Report. Best Physician Assistance Programs in 2019. Accessed July 4, 2022. <https://www.usnews.com/best-graduate-schools/top-health-schools/physician-assistant-rankings>
- Department of the Army. *Field Manual (FM) 7-22. Holistic Health and Fitness*. Washington, DC: Department of the Army; October 8, 2020. Accessed May 19, 2022. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30714-FM_7-22-000-WEB-1.pdf
- National Academies of Sciences, Engineering, and Medicine. *Army Combat Trauma Care in 2035: Proceedings of a Workshop—in Brief*. Washington, DC: The National Academies Press; 2020. Accessed July 4, 2022. <https://nap.nationalacademies.org/catalog/25724/army-combat-trauma-care-in-2035-proceedings-of-a-workshop>

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Enhancing Occupational Performance Among Afghan Travelers Following Evacuation to a United States Military Base in Germany

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INTRODUCTION

In August 2021, following the official withdrawal of US troops from Afghanistan, the US military supported the evacuation of over 30 000 Afghans to US military bases in Germany as part of the largest non-combatant evacuation operation: Operation Allies Welcome.^{1,2} US military personnel rapidly established life support areas (LSA) at multiple bases and posts throughout Germany, providing short-term housing, sustainment, and medical support. Upon arriving at US military bases in Germany, Afghan travelers entered into a two-year humanitarian parole period where they received mandatory medical exams, health screenings, vaccinations, and other life-sustaining procedures at the LSAs.³ In conjunction with Role 1 health-care services and collaboration with translators, a combat operational stress control (COSC) unit from Germany provided Afghan travelers with behavioral health (BH) crisis intervention services. COSC units are deployable medical detachments composed of an interdisciplinary team of BH professionals who aim to provide echelon above brigade (EAB) area support to service members throughout the deployment cycle. COSC units specialize in preventing, identifying, and managing acute stress reactions that would otherwise impact individual service members and unit readiness.⁴ As one of four active-duty COSC units in the US Army, the 254th COSC's mission is to provide expedient BH prevention and treatment services throughout Europe and Africa areas of responsibility. This skill set made them the ideal candidate to support the psychological well-being of Afghan travelers.

Without a prior established standard operating procedure to support a mission like Operation Allies Welcome, the 254th COSC formulated an appropriate plan of action considering the medical rules of engagement. Small teams of one BH officer and technician provided BH screenings and abbreviated treatment to prevent BH emergencies warranting evacuation to the nearest hospital. After implementing BH treatment teams, the COSC's occupational therapy (OT) team, composed of two occupational therapists and three occupational therapy technicians,

conducted outreach walkabouts as part of BH prevention services. Within COSC units, OT personnel often serve in prevention teams.⁵ These teams provide universal services targeted at the reduction of the severity or occurrence of BH disorders and combat operational stress reactions of service members.⁴

The ideal method for COSC units to determine the BH requirements of a group is to conduct a unit needs assessment (UNA). Defined within ATP 4-02.8, Force Health Protection, a UNA is a valuable tool to determine needs and produce recommendations for COSC-specific interventions.⁴ When executed with military units, UNAs can include surveys, focus groups, interviews, and a review of trend indicators (such as UCMJ actions, BH utilization rates, misconduct, or suicide rates). While an informal UNA may not produce the complexity of data as a formal UNA process, can provide a quick assessment of the sample and help create timely recommendations to make immediate changes. The purpose of this article is to describe the COSC interventions utilized by the OT team to assess for disruptions within occupational performance amongst a small group of Afghan travelers while at an LSA in Germany and to discuss cultural implications to be considered by medical professionals working with an Afghan population.

Pre-assessment

When conducting UNAs, the COSC personnel must determine the best method consistent with the operating environment. During the pre-assessment phase of the UNA, the OT team developed a plan to execute an informal UNA with the Afghan travelers at one US military base in Germany utilizing an interview method. The OT team organized a preliminary discussion with an Afghan elder leader to assess the appropriateness of interviewing Afghan personnel at one LSA. In Afghan villages, elders represent the political aspects of the people and have a major social influence within the village.⁶ Because elders and leaders are the most valued and revered members of their culture, it is imperative to establish their trust first. This elder worked as a translator alongside the US

military in Afghanistan for over 15 years. He appreciated the OT team's willingness to hear directly from Afghan people regarding their current needs and learn about their unique backgrounds. He agreed to serve as the team's translator for all interviews. After receiving collective support from the other Elders in the LSA, the OT team received approval from the LSA military leaders to conduct the interviews.

Following these actions, the team developed interview questions. The questions combined UNA principles with the Person-Environment-Occupation-Performance (PEOP) model.⁷ Viewed as a holistic model, the PEOP frames enablers or barriers to occupational performance based on the context of the individual, their environment, and their occupation. Characteristics of the person include psychological, motor, sensory and perceptual, cognitive, or spiritual components, whereas environmental factors include physical and nonphysical aspects such as cultural and societal demands. Occupations are valued roles, tasks, and activities that an individual wants or needs to do in their daily life. This client-centered model highlights the complexity of the person-environment-occupation relationship and defines occupational performance as the outcome of this three-tier interaction.

Through the lens of the PEOP model, the OT team explored the relationship between psychological and spiritual factors, the societal and physical environment, valued roles, occupations (previous and current), and Afghan travelers' ability to perform meaningful cultural activities and tasks. The OT team focused on a client-centered approach to identify obstacles impeding client functional performance. The interview goals examined any potential barriers within the LSA, their impact on the Afghan travelers' participation and life roles, and identified inadequate occupation-enabling resources. Additionally, the semi-structured nature of the questions provided interviewees with the latitude to share additional information about their journey from Afghanistan to Germany, discuss their goals upon arriving in the United States, and suggest activities or events that would bring purposeful activity and meaning to the community.

Before conducting the interviews, the OT team received a 2-hour, face-to-face Afghan and Islamic cultural awareness training. The Afghan translator established the interview times, dates, and interviewees for the OT team. He selected members of the LSA who were willing to discuss their stories with the team.

ASSESSMENT

The OT team split into female and male groups to interview people of the same sex. The team provided the female

interviewees with the option to complete the interview with the male translator and female OT team or to have their husband or other male family member present, as is customary in Afghan culture. The OT teams conducted the discussions within a large open tent, each lasting 30 to 60 minutes. The interview team served tea and cookies to show appreciation for their participation. For each interview, one OT team member served as the facilitator, while another served as a scribe. The OT team did not video or audio record the interviews.

The OT team completed seven interviews in 3 days (four females and three males). The personnel's ages ranged from 16 to 55 years old and arrived from Afghanistan less than 1 to 5 days before the interview. Due to the short duration of the Afghan travelers' stay in Germany and the exploratory nature of this project, the OT team deemed the small sample size sufficient to implement suggestions and recommendations.

Table 1. Questions 1 to 3 of the Semi-Structured Interview

Question	Response
What did a typical daily routine look like for you?	<p><i>Participant 1:</i> "Care for my children and my home while running a Non-Governmental Organization teaching First Aid and COVID-19 education for work."</p> <p><i>Participant 3:</i> "Before having my son, I worked as a Religious Teacher. Now, my day consists of childcare and homemaking tasks."</p> <p><i>Participant 4:</i> "I am a student; I play soccer and study to become a doctor."</p>
What did you like to do for fun/others/yourself?	<p><i>Participant 1:</i> "Serve the community as much as I can, teach them how to protect themselves from illness."</p> <p><i>Participant 4:</i> "Playing sports with my friends, caring for my siblings and family."</p> <p><i>Participant 5:</i> "Working out, playing sports, and spending time with my family."</p>
What have you been able to continue to do since leaving Afghanistan?	<p><i>Participant 3:</i> "I am too stressed and worried about my family back in Afghanistan to do anything here."</p> <p><i>Participant 6:</i> "I spend time with my family and play soccer to pass the time."</p>

The first set of questions focused on the interviewees' daily lives before leaving Afghanistan and since arriving in Germany (Table 1). Of the purposeful activities conducted before leaving Afghanistan, all the participants discussed occupational barriers and an inability to perform most of these tasks at their temporary location in Germany. Four

interviewees became emotional when recounting the established routines and valued roles left behind at home to escape Afghanistan.

During the interviews, the OT team asked the participants if they felt comfortable sharing their personal stories surrounding their exit from Afghanistan. Two participants agreed to share their journey with the OT team (Table 2). While horrific and terrifying, their narratives helped shape a greater understanding of the potentially traumatic events encountered en route to Germany.

Table 2. Personal Journeys from Afghanistan to Germany

Question	Response
Please describe your journey arriving in Germany.	<p><i>Participant 1:</i> "The Taliban started taking over providences, and people fought back. People were getting displaced without water or any support. My family and I moved to Kabul as displaced people. We saw how helpful the Americans were in trying to help us escape Afghanistan. We went to the Kabul airport to try and get out on a flight. We slept at the airport for 13 nights but had to leave because of the violence. We left two hours before the attack at the airport. There were thousands of people, and tear gas was thrown into the crowd. I fell and hurt my leg as I was going. I know that we are extremely fortunate to get out of Afghanistan when we did. We had a car escort us back to the airport, and we were able to secure a flight here to Germany. Once inside the airport, I remember asking, 'Is this a dream?' All 18 of my family members made it safely."</p> <p><i>Participant 7:</i> "I arrived here with my brother and his wife. We waited outside the airport for three days with limited food and water. Thankfully my brother knew someone in the States. They were able to make some calls and arrange for us to fly out. At first, I wasn't sure if I wanted to leave Kabul, but after seeing how the Americans treated people and were kind, I was convinced that I wanted to come."</p>

The Afghan travelers shared aspects of Afghan culture in the context of environmental, spiritual, and social factors. The role of the environment is pivotal in fostering healthy interpersonal skills and developing social networks. Spiritual components included having a greater sense of personal understanding about one's place in the world and one's ability to be a catalyst of change for others. The Afghan travelers expressed what they wanted care providers to know about their culture as they transitioned to living in the United States (Table 3).

Table 3. Understanding Afghan Culture During this Transition to Life in the United States

Question	Response
What would you like us to know or understand about your culture that would help with your transition for you or for your family?	<p><i>Participant 1:</i> "There are many differences within Afghan culture. Even though we are from the same country, there are a lot of differences based on where you are from and what dialect you speak. There is discrimination but we need to be united. We need to know how to be a good human for society and we need to accept one another. Everyone is emotionally affected. We've all encountered loss, of family, of homes and friends. We need encouragement for the future."</p> <p><i>Participant 7:</i> "There is a strong emphasis on community. My hope is that while we are here for however long, that people become more social and live as one family. Shoulder to shoulder, if we come and work together, it will make our experience more pleasant and beautiful."</p>

After conducting the interviews, the OT team convened to analyze findings, discover themes, and formulate practical solutions. Following each interview, the OT team put interview answers into an Excel spreadsheet for qualitative coding. The team used narrative analysis with inductive coding techniques to examine the travelers' stories for themes.

The two occupational therapists identified three major themes for the UNA: hope for the future, gratitude for their support during their journey, and a desire for purposeful activity while in the LSAs. Participants 2 and 3 expressed hope for better opportunities for themselves and their children, and both desired to learn English. Learning English would facilitate assimilation and decrease anxiety and anticipation during the transition. Participant 3 looked forward to finding opportunities to support Afghan children and the LSA community. This identified a lack of purposeful activity among children and highlighted occupational barriers to play. Engaging children in activities would increase teamwork and morale among children. Participant 5 hoped to be reunited with his family and desired to continue serving others in the LSA by voicing their concerns and needs. Participant 1 expressed intense gratitude: "Americans took us from hell to here, and we will not forget that." The OT team channeled this sentiment of gratitude, coupled with a desire to educate others, to conduct life skills classes for other travelers.

The interview data provided the OT team with sufficient information to make recommendations on improving

Afghan travelers' quality of life while in Germany. While avoiding over-generalizing findings during UNAs is crucial, the OT team recognized that the UNA results provided general solutions that others could replicate at the other LSA locations in Germany.

Table 4. Unit Needs Assessment Result Themes

Theme	Response
Hope for the future	<i>Participant 2:</i> "I hope there will be opportunities for me to stand on their own two feet, and that my children will have the chance to thrive in school and be successful."
	<i>Participant 3:</i> "My hope is that I am able to find the same sense of purpose that I had in Afghanistan. I want to continue making a difference in my community, wherever I end up."
	<i>Participant 3:</i> "We are excited for our children's future in America."
	<i>Participant 5:</i> "My role here is to be positive. I derive meaning from helping others and being the megaphone for our people. Some come to me with their needs and voice their concerns. I've provided encouragement for others as well and I derive meaning from my job as an interpreter."
Gratitude for support	<i>Participant 1:</i> "I am thankful for all the care that we received. We are in good health and have everything that we need. There is peace and stability. I want to give back to the community."
Desire for purposeful activity	<i>Participant 2:</i> "I do nothing here—we need things to do."
	<i>Participant 4:</i> "We want to begin learning English while we're here."
	<i>Participant 6:</i> "I like to read, and as a high school student I want to continue my studies while I'm here."
	<i>Participant 7:</i> "I spend time with my family and play soccer to pass the time." "The children need entertainment in the camp areas."

POST-ASSESSMENT AND IMPLEMENTATION OF FINDINGS

The interviewees provided feasible solutions when asked for suggestions on improving the LSAs. Participant 2 recommended classes on childcare, first aid, cardiopulmonary resuscitation (CPR), hygiene practices, and familiarization with the English language. Participant 3 suggested more events for the children to increase play and energy

expenditure. Two of the four female participants expressed a desire for a tea group for the women, as this is typically a daily occurrence for them in Afghanistan and provides a social outlet. One of the male participants suggested establishing additional soccer fields and volleyball courts for more men to play sports.

The OT team engaged with LSA leadership to discuss implementing several ideas. First, the OT team scheduled an event to teach female travelers infant/child CPR classes and basic first aid. Participant 2 assisted with class instruction, and the OT team provided mannequins and classroom materials with pictures. The team created a roster of 15 attendees due to only having one CPR instructor from the OT team. The team provided hands-on, life-saving techniques to 15 mothers and gave the attendees brochures to help them teach others within the LSA. Second, to promote societal cohesion and engage the children in the occupation of play, the OT team coordinated an event consisting of relay races, games, and educational activities. Of the children aged 2 through 16 at one LSA, over 40% participated in the play event. Several older children, one of whom spoke English, assisted with organizing the younger children into age groups and translating instructions. The children's parents expressed gratitude toward the OT team for providing their children with purposeful play activities that promoted inclusion and fun. Lastly, the OT team brought tea to the LSA to encourage a cultural environment that fostered social interaction. The activities enriched relationships between the OT teams, parents, and children, creating an atmosphere of trust while dissolving barriers between military providers and Afghan travelers.

IMPLICATIONS FOR CLINICAL PRACTICE

Clinicians working with the Afghan population must understand the cultural environment and valued roles and occupations. The female interviewees voiced a strong desire to improve their communities and positively impact the lives of children through education and play. Through the PEOP model, clinicians can identify enablers and barriers to occupational performance. Occupational therapists can assist with finding new meaning in the transition from life in Afghanistan to travelers' new roles and environments. Psychological factors must also be considered, including acknowledging potential trauma during the movement from Afghanistan to the United States. Understanding the importance of community and societal hierarchies, including the involvement of elders and leaders, facilitates buy-in and demonstrates respect for Afghan culture, especially for more extensive group interventions. While the OT team respected cultural norms and utilized same-sex interviewers and interviewees, asking patients about provider gender preference is encouraged and demonstrates openness and understanding.

FUTURE DIRECTION FOR COMBAT AND OPERATIONAL STRESS CONTROL

To ensure enduring BH impacts in future operations, COSCs should immediately deploy prevention teams concurrently with BH treatment teams. This allows proper assessment of the situation while addressing treatment needs. Measures such as walkabouts and UNAs can facilitate the early identification of occupational barriers and guide COSC operations. Early identification allows for more frequent interventions, appropriate follow-up, and modifications, as indicated by participant feedback. Due to the fluidity of operations at the LSAs during Operation Allies Welcome, establishing early contact and communication with LSA leadership may have facilitated more routine interventions versus ad hoc support. In the future, interviews should be more robust and numerous, which may provide greater insight for COSC providers on the needs of the population and ways to ease the transition for travelers.

CONCLUSION

Through the lens of the PEO model, the UNA process highlighted occupational barriers of Afghan travelers in an LSA in Germany. The COSC occupational therapists provided necessary and timely occupation-based interventions, while the BHOs provided essential treatment to prevent adverse incidents. The Afghan travelers' stories revealed gratitude, hope, and a desire for purposeful activities. Their narratives offer proof of the importance of understanding cultural implications and how removing occupational barriers can lead to enhanced performance outcomes.

References

1. Rivera M, McCrory M, Ngho G. Operation Allies Welcome: immediate support to America's largest non-combatant evacuation operation. *Army Sustainment*. 2022;40-46.
2. Doorndos C. Ramstein Air Base spent \$56.3 million on Afghan refugees in 2 months. *Stars and Stripes*. December 1, 2021. Accessed January 22, 2024. <https://www.stripes.com/theaters/europe/2021-12-01/ramstein-air-base-military-evacuation-afghanistan-refugees-germany-3824905.html>
3. US House of Representatives Committee on Homeland Security. *Operation Allies Welcome: Examining DHS's Efforts to Resettle Vulnerable Afghans*. Committee Print 117-33. 117th Cong, 1st sess (2021).
4. US Army. *Force Health Protection*. US Army; 2020. Army Regulation 4-02.8. Accessed November 22, 2022. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30124-ATP_4-02.8-001-WEB-3.pdf
5. Smith-Forbes E, Najera C, Hawkins D. Combat operational stress control in Iraq and Afghanistan: Army occupational therapy. *Mil Med*. 2014;179(3):279-284.
6. Center for Army Lessons Learned. *Afghan Culture: Observations, Insights and Lessons*. Center for Army Lessons Learned. Accessed December 1, 2022. <http://call.army.mil>
7. Cole MB, Tufano R. *Applied Theories in Occupational Theory: A Practical Approach*. SLACK Incorporated; 2008:127-133.

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Decoding Challenges and Opportunities of the Individual Critical Task Lists for the US Army Physician Assistant

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ABSTRACT

The initiation and cyclical reassessment of individual critical tasks (ICTs) and their compilation into individual critical task lists (ICTLs) is intermittently brought before soldiers in all professions, including medical providers. Despite increased relevance and inquiries for feedback and ability to fulfill ICTs, there lacks formally compiled information published for review by clinicians. This obscurity can make completion of ICTLs more difficult to strategically understand. Here, we provide a brief narrative review of the development and evolution of ICTLs, with a focus on the US Army physician assistant (PA).

INTRODUCTION

Individual critical tasks (ICTs) are professional skills and competencies that individuals must perform to accomplish their missions and duties in a full range of Army operations, specifying the knowledge, skills, and attributes required. These ICTs drive education and training, determined by appointed Critical Task Site and Selection Boards (CTSSBs) in coordination with multiple identities and inputs (Figure 1). These tasks, in turn, form individual critical task lists (ICTLs) that individuals must perform to accomplish their mission and duties and are outlined and updated at intervals for each Army area of concentration (AOC), including AOCs within the Specialist (SP) Corps. Army leadership can survey, review, and identify potential training deficiencies or initiate task reviews and revisions. While the ICTL development process may seem vague to frontline providers, it presents standardized professional responsibilities aimed at maintaining deployment-focused competency in line with nonmedical military occupational

specialty (MOS) positions and in accordance with Army regulations. Despite the prevalence of ICTLs, there is little open-source text for understanding the ICTL development process across the force and attempts to objectively translate medical competencies in the same fashion as other AOCs' ICTs can be difficult. Here, we attempt to decipher and describe this process, primarily as it relates to the US Army physician assistant (PA), 65D, and the military medical force.

THE SELECTION PROCESS

Traditionally, Training and Doctrine Command (TRADOC), via TRADOC pamphlets (TPs), dictates a soldier's tasks must be observable, measurable, specific, and have a definite beginning and ending.¹ Through the "job analysis" process, ICTs are initially identified and described for an AOC and determined if they are shared across multiple occupations.¹ Job analysis is intended for reevaluation every 3 years, but can be conducted sooner for several reasons, to include noted deficiencies in training or education, or a significant MOS realignment.^{1,2} This last reason may be due to a shift in force or mission posture, such as the recent orientation towards large scale combat operations or multidomain operations (LSCO or MDO).^{3,4}

The job analysis process first seeks to collect and analyze task performance data, update the target audience description, compile a total task inventory, and select and nominate ICTs to the CTSSB.¹ The CTSSB then reviews and selects the ICTs to compile a draft ICTL, which is then submitted to the proponent command for approval. For PAs, the proponent command is the commanding general of the Medical Center

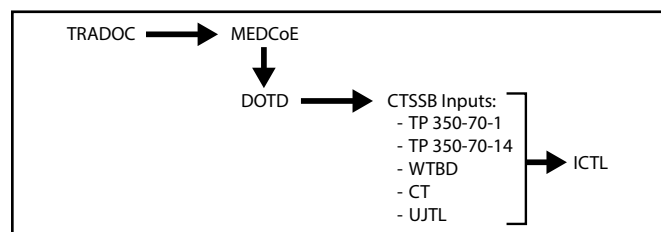
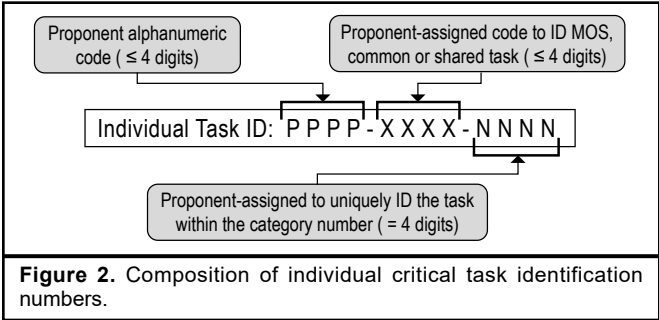


Figure 1. Flow of the individual critical task list development process. CT: collective task; CTSSB: Critical Task Site Selection Board; DOTD: Directorate of Training and Doctrine; ICTL: individual critical task list; MEDCoE: Medical Center of Excellence; TP: training pamphlet; TRADOC: Training and Doctrine Command; UJTL: universal joint task list; WTBD: Warrior Task Battle Drill.

of Excellence, but the role is delegated to the director of the Directorate of Training and Doctrine (MEDCoE). Three sections of tasks comprise the individual task identifiers (IDs) (Figure 2): the proponent alphanumeric, the MOS ID, and the task ID. Specialist Corps officers align under the MEDCoE with a proponent alphanumeric of 081, and most utilize either their respective MOS ID or 000 for common tasks across jobs. The final four digits mark the specific task. Once approved, the ICTL is published to the Central Army Registry for future reference.



MAKING ENDS MEET: ATTEMPTING TO MERGE MEDICAL SKILLS AS MOS TASKS

Several factors made the creation and now maintenance of ICTLs difficult, chief among them balancing measurable medical tasks generalized across medical providers

for deployment versatility with the specialty skills often needed for day-to-day force support.^{5,6} Initially, medical ICTLs were mostly focused on individual procedures, such as “perform cricothyroidotomy” or “perform rapid sequence intubation.” The authors note that this approach enabled providers to execute 80% of their ICTLs in periods of only a few hours on simulators, meeting their respective annual thresholds.^{6,7} Given many ICTs are noted to be rare at military treatment facilities (MTFs), especially amongst providers like PAs working in primary care or narrowed medical specialties, a system of condensed training to meet ICTL goals assisted with ICT maintenance with little clinic disruption.⁶⁻⁸ Similarly, just-in-time training (JITT) condensed ICT training at MTFs to enable completion of most of the tasks on an ICTL immediately prior to medical provider deployment.⁵ Suggestions that ICTs could be condensed and performed just once contradict the ICTL intent for spaced repetition and interval learning.

Recently, the job analysis process attempted to match medical ICTL updates to their original underlying Army purpose as well as narrow their scope. In this approach, ICTLs condensed from procedure-heavy tasks directly performed by medical providers (needle thoracotomy, rapid sequence intubation) to a broader managerial medical role (Figure 3). This placed providers like PAs in line with their combat arms officer counterparts, who, rather than pursuing soldier-level ICTs (“fire an M4 rifle”, “build a foxhole”), are required to perform broader level tasks (“conduct troop leading procedures”, “conduct a company defense”). This aligns with recent research that

2019		
<ul style="list-style-type: none">• Maintain current unrestricted privileges• Complete basic life support• Complete the advanced cardiac life support course• Complete pediatric advance life• Complete the advance trauma life support course• Complete the medical management of chemical & biological casualties course• Complete army trauma training center• Complete tactical combat medical care course• Complete medical effects of ionizing radiation course• Obtain intraosseous access• Perform cricothyroidotomy• Perform needle decompression• Treat a burn patient• Conduct a MASCAL exercise• Perform initial medical management of blunt trauma• Perform extended focused assignment with sonography in trauma (eFAST)• Perform advanced cardiac life support codes• Perform trauma resuscitation• Place a tourniquet	<ul style="list-style-type: none">• Treat eye trauma• Splint fractures• Treat abscess/cyst• Repair simple lacerations• Perform joint arthrocentesis/injection• Treat disease non-battle injuries• Treat traumatic brain injury/concussion• Perform prolonged field care• Perform rapid sequence intubation• Perform procedural sedation• Complete brigade healthcare providers course• Conduct unit level medical training• Complete advance burn life support• Employ telemedicine• Treat a patient requiring blood products• Perform health threat assessments• Treat combat casualties under fire• Treat a severe head injury• Place a tube thoracostomy	<ul style="list-style-type: none">• Treat an emergency department patient• Perform initial medical management of penetrating trauma• Evacuate a casualty• Perform reductions of joint dislocations• Monitor medical readiness data• Perform personnel reliability program care• Conduct medical pre-deployment site survey• Conduct redeployment medical activities• Perform medical transfer of authority• Conduct medical surveillance• Analyze disease & non-battle injuries• Perform field preventive medicine assessments• Treat chemical, biological, radiological, & nuclear combat casualties• Treat environmental injuries• Treat behavioral health disorders• Treat inhalation injury• Complete military vaccination course
2022		
<ul style="list-style-type: none">• Employ telemedicine• Treat abnormal gynecological bleeding• Treat aural blast/acoustic trauma• Treat life threatening external hemorrhage• Treat a traumatic amputation• Treat a compromised airway• Perform resuscitative care• Treat a traumatic pelvic injury• Treat a traumatic extremity fracture(s)	<ul style="list-style-type: none">• Treat a complex blast injury• Treat eye trauma• Treat a burn injury• Treat a severe head injury• Treat a crush injury• Treat a spine injury• Treat a thoracic injury• Treat abdominal injury• Treat a traumatic brain injury	<ul style="list-style-type: none">• Treat acute behavioral health conditions• Treat a CBRN injury• Treat a traumatic wound• Provide enroute care• Treat a military working dog• Treat a vascular injury• Treat sepsis• Direct unexploded ordnance management in an injured patient

Figure 3. A comparison of the 2019 and 2022 65D individual critical task lists showing the consolidation of individual critical tasks.

nearly all immediate combat medical care is not performed by medical officers like PAs, but rather in collaboration with subordinate medics, supporting this oversight role.⁹

Despite a shortened ICTL, the widened scope nevertheless allows PAs the opportunity to consider and perform multiple procedures within each task and better represents their roles while deployed. As the subject matter expert (SME) at the unit-level and within most MTFs, PAs must be adequately oriented, trained, and practiced on procedures that may need to be performed as part of medical management.^{10,11} For instance, although “perform cricothyroidotomy” and “perform needle decompression” are no longer listed on the ICTL, both can be appropriately nested to develop and execute a treatment plan in the updated ICTs “treat a compromised airway” and “treat a thoracic injury,” representing critical performance steps within each task. This mechanism allows providers to pursue a greater understanding of the pathophysiology, assessment, and management of these conditions, rather than performing only the mechanical tasks as in prior ICTL iterations.

FUTURE TASK EVALUATION AND DEVELOPMENT

The ICTL development process is intended to continually evolve and adjust based on force needs and capabilities, as per the job analysis. However, despite higher inquiries as to completion percentages and plans to fill-in training gaps, evaluation criteria for broad ICT standards such as “make a treatment plan” can seem vague and cause confusion and concerns as to how to conduct and fulfill ICTL requirements. Numerous courses, such as Tactical Combat Medical Care (TCMC) and Advanced Trauma Life Support (ATLS), both of which are mandated as part of the updated 65D ICTL, fulfill many current ICTs. However, TCMC and ATLS are among most courses that are mandated every four years, which leaves multiple periods without these training opportunities. Furthermore, reliance on scheduled courses for ICTL fulfillment risks shortcomings due to cancelled courses or other unavailability. Therefore, line unit providers are left to facilitate training through other means, such as at local facilities (ie, a medical simulation training center), large military medical exercises, or commercial medical training opportunities (ie, a national medical conference). Although this presents challenges, it is imperative that unit medical officers emphasize ICTL maintenance as a commander’s responsibility—one that demands ample command support.

High-fidelity simulator models enable local opportunities for repeat procedural training at regular intervals and lowered cost.^{6,7,12} However, an enhanced focus on overall medical management over simple procedure technical

proficiency necessitates moving beyond simulation models and placing PAs in situations of actual patient care as part of a medical team. While there are few organized partnerships allowing military PAs to work directly in civilian facilities, other possibilities include encouraging parttime employment in civilian facilities, preferably those with higher acuity to encourage ICT performance in real-world scenarios.⁸ Leaders should encourage and support staff working as primary care providers in clinic settings to seek volunteer opportunities at the MTF in coordination with command to gain broader exposure and employ ICTs, though this strategy requires time allocation. Finally, PAs should consider the benefits of advanced training opportunities offered by the long-term health care education training programs in orthopedics, emergency medicine, and surgery-critical care, which, in addition to having their own respective ICTLs, may fulfill some requirements in their day-to-day employment during training and following graduation.

The ability to attain and maintain the ICT skillset requires individual initiative and command emphasis, and PAs should take advantage of every opportunity for skill maintenance with an engaged and supportive command structure. This includes local and travel opportunities to military courses such as advanced life saver and TCMC. Units should coordinate to establish an ICT validation schedule and share the responsibility to manage and resource training, and seek input from senior PAs with procedural and contextual experience to attain optimal practice. This training should be given priority and scheduled accordingly, similar to sergeant’s time training or other universal soldier tasks such as marksmanship and physical fitness.

CONCLUSION

The ICTL establishes expectations in medical competency to ensure force support readiness and continues to evolve based on feedback and future missions. While ICTs appear to be less procedure-focused, concentration on medical management and care planning nevertheless demands procedural competency to maintain the SME expectations of PAs. Future research should evaluate the impact of ICTs and the job analysis cycle on skill competency with an overall goal of ensuring the existence of adequately resourced systems that will balance ICT competency validation opportunities with feasibility and resource constraints.

Contributorship Statement

All authors conceived the review concept, wrote the first draft, and read, provided critical revisions, and approved the final manuscript.

References

1. Department of the Army. *TRADOC Pamphlet 350-70-1, Training Development in Support of the Operational Training Domain*. Washington, DC: Department of the Army. Published February 12, 2019.
2. Department of the Army. *TRADOC Pamphlet 350-70-14, Training and Education Development in Support of the Institutional Domain*. Washington, DC: Department of the Army. Published 2015.
3. Schauer SG, Long BJ, Rizzo JA, et al. A conceptual framework for non-military investigators to understand the joint roles of medical care in the setting of future large scale combat operations. *Prehosp Emerg Care*. 2023;27(1):67-74. doi:10.1080/10903127.2021.2008070
4. Fisher AD, April MD, Naylor JF, Kotwal RS, Schauer SG. The battalion aid station-the forgotten frontier of the Army Health System during the Global War on Terrorism. *Mil Med*. 2023;188(5-6):1240-5. doi:10.1093/milmed/usab401
5. Gillis BT, Murray WO, Brown WJ. The military treatment facility COVID-19 response in an isolated rural environment: challenges and lessons learned. *Mil Med*. 2021;186(12 suppl 2):44-49. doi:10.1093/milmed/usab105
6. Sattler LA, Schuety C, Nau M, et al. Simulation-based medical education improves procedural confidence in core invasive procedures for military internal medicine residents. *Cureus*. 2020;12(12):e11998. doi:10.7759/cureus.11998
7. Hertz AM, Devasahayam R, Brand TC, Caras RJ. Urology individual critical task list: creation and validation of a simulation curriculum. *Mil Med*. 2020;185(9-10):e1406-10. doi:10.1093/milmed/usaa132
8. Carius BM, April MD, Schauer SG. Procedural volume within military treatment facilities - implications for a ready medical force. *Mil Med*. 2020;185(7-8):e977-e981. doi:10.1093/milmed/usaa001
9. Fisher AD, Naylor JF, April MD, Thompson D, Kotwal RS, Schauer SG. An analysis and comparison of prehospital trauma care provided by medical officers and medics on the battlefield. *J Spec Oper Med*. 2020;20(4):53-59. doi:10.55460/L8S6-CU4F
10. Rabener MJ, Breeze J. Physician assistant utilisation in the US Armed Forces: applicability to the UK Defence Medical Services. *BMJ Mil Health*. 2021;167(1):56-58. doi:10.1136/jramc-2019-001298
11. Fedor PJ, Dorsch J, Kharod C, Paladino L, Rush SC. Rationale and implementation of a novel special operations medical officer course. *J Spec Oper Med*. 2021;21(1):25-29. doi:10.55460/Y7JG-KP26
12. Carius BM, Thompson SN, Aden JK, Sletten Z, Hanlin ER. Procedural confidence and usability of a novel lateral canthotomy and cantholysis simulator compared to a traditional porcine model in emergency medicine training. *US Army Med Dep J*. 2021:38-43.

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The Person-Environment-Occupation-Performance Model: Applying Theory Within Army Combat Operational Stress Control units

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ABSTRACT

This article proposes the implementation of the occupational therapy Person-Environment-Occupation-Performance (PEOP) Model to promote client-centered and evidence-based care for combat and operational stress control services provided in the military context. Currently, the occupational therapy literature lacks evidence describing occupational therapy's role in combat and operational stress control (COSC) using the PEOP model. A review of the model's features is provided with a case study for a military service member whose primary occupation is impacted by the effects of combat stress. This article provides a case study exemplar using the PEOP model for client-centered and evidence-based practice. The model may guide occupational therapy practice in a nontraditional setting for service members whose occupations may be impacted by the interconnectedness of their own personal factors, the specific occupations they engage in, and the unique military environment in which they function.

A revised version of the Hippocratic Oath states, *"I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon's knife or the chemist's drug"*.¹ Though not specific to the field of occupational therapy, this quote captures the essence of the profession, which has practiced combining the arts with science for centuries. The origins of the profession can be traced back to the 1700s during the rising of social movements, long before the field had the title or status that it does today.²

In the 17th and 18th centuries, freethinking activists began to challenge the monarchical systems that constrained society, resulting in mass expansion of knowledge, science, and social justice.² Such enlightenment encouraged early leaders in the field to avow for more humane treatment of persons with mental illness who, up until that point, had been relegated to institutionalization and barbaric treatment by society. Influential pioneers began to recognize the unique value of engagement in daily activities to restore health over restricted activity and rest. Thus, the concept of functional activities as therapeutic interventions began to take hold, shaping what would eventually be termed *occupations*.²

In the early 1900s, World War I broke out, killing countless American service members and physically and mentally

injuring many more. It was recognized that the surviving disabled service members would benefit not only from rehabilitation of his physical injuries, but also vocational training, to enhance their livelihood. Subsequently, the role of *reconstruction aide* was established.²⁻⁴ Reconstruction aides were charged with the task of occupying service members' minds. In addition to rote exercises to address the physical injuries of war, they also employed prescribed crafts, activities and "curative occupations" to target the mental injuries of war.²

Throughout the years, what is now "occupational therapy" has expanded significantly, with contributions from the advancements of both science and humanities. The World Federation of Occupational Therapy's (WFOT's) position paper on the profession's role in mental health, states "occupational therapists...promote good mental health and well-being with the intention of both preventing the onset of mental health problems and facilitating recovery for those experiencing mental health difficulties".⁵ Army occupational therapists (OTs) assigned to a combat and operational stress control (COSC) detachment have two distinct missions: (1) to guide service members in the development and optimization of foundational skills to act as a mental buffer to anticipated combat stress and (2) to provide service members with support and strategies to productively

manage the combat stress that can occur during combat which left unchecked can manifest and interfere with a soldier's primary occupation—*combat readiness*.

Combat and operational stress control (COSC) OTs provide interventions based on their understanding of the complex interaction between the service members (person), the combat environment (environment), and the often-taxing roles that service members are asked to fulfill in combat (occupation). Army OTs address combat stress based on the same principles utilized by civilian OTs to manage symptoms of behavioral health. The American Occupational Therapy Association (AOTA) describes this process as “the manipulation of factors that influence participation and performance, such as identification and strategic and intentional use of strengths, skill development, task adaptations, environmental supports and modifications, emotional and sensory regulation strategies, cognitive adaptations, biomechanical interventions, and habit and routine development”.⁶ Army OTs assigned to a COSC promote service member participation in everyday occupation by analyzing and addressing barriers to performance, such as stress incurred in combat, as these interfere with combat readiness.

COMBAT OPERATIONAL STRESS CONTROL UNIT

According to official Army doctrine, “control of stress is often the decisive difference between victory and defeat across the operational continuum”.⁷ The Field Manual (FM) states that the sequela of uncontrolled stress has the potential to erode combat effectiveness and may ultimately contribute to defeat at the hands of the enemy.⁷ More recent published guidance emphasizes the importance of managing stress reactions, the manifestation of which may result in disastrous physiological responses, such as diminished reaction times, reduced ability to communicate, slower cognitive processing and impaired motor skills, significantly hampering a service member's combat effectiveness and therefore rendering him or her susceptible to defeat.⁸

Much like the history of occupational therapy, Army COSC efforts have continuously transformed, based on the evolving needs of service members. During World War I, it became clear that service members would benefit from early care for their combat stress, even while still on the frontlines.⁹ By World War II, the Army had deployed psychologists alongside service members and the first forward centers of care were created, where service members who were enrolled, “practiced battle drills daily and maintained an exercise routine while at the site”, a hallmark of COSC's current philosophy.⁹ During the Vietnam War, a team of 23 behavioral health individuals were deployed to provide far-forward care on the front

lines. And finally, in 1989, continuing efforts came to be known as *combat stress control*.⁹

As the battlefield has continued to transform and technologically advance with each conflict so have the capabilities of the COSC. Currently, the Army defines COSC as “a coordinated program of actions taken by military leadership to prevent, identify, and manage reactions to traumatic events that may affect exposed organizations and individuals during unified land operations”.¹⁰ Areas of concentration that comprise the modern COSC include social work, psychology, nursing, and occupational therapy. The overarching mission of all disciplines on the COSC team is to assist service members in preventing, reducing, or managing their reactions to the stress of combat operational stress reactions (COSRs).¹¹

Combat operational stress reactions (COSRs) can range in severity from mild physiological changes, such as a pounding, rapid heartbeat, to a severe state of freezing under fire, which can potentially undermine combat effectiveness in battle.⁷ When service members work to develop and effectively harness the skills necessary to manage their physical and emotional responses to stress, they may experience adaptive stress reactions valued in combat, such as a heightened sense of awareness, extreme courage, and enhanced group cohesiveness. The cumulative effect of these experiences can result in posttraumatic growth, otherwise known as finding renewed meaning in life.⁷

The modern COSC mission is contained in nine functional areas that cover the entirety of services, both preventative and restorative.⁷ These include: (1) unit needs assessment, (2) consultation and education, (3) traumatic events management, (4) reconstitution support, (5) combat and operational stress control triage, (6) combat and operational stress control stabilization, (7) soldier restoration, (8) behavioral health treatment, and (9) soldier reconditioning.⁷ Combat operational stress control (COSC) providers and commanders collaboratively work to prioritize functional areas based upon mission, enemy, terrain and weather, troops, time available, and civilian (METT-TC) considerations.⁷ Military leaders use the METT-TC acronym to prioritize areas of focused analysis during planning phases of operations. Commanders at all levels engage in these analyses, which are essential to military readiness.

Occupational therapy is often an essential service for persons experiencing disease, hardship, injury, or illness to support participation in the occupations that they desire to or need to do. Service members are a unique subset of the population who require individualized support to maintain combat readiness. Therefore, this paper will discuss the unique contribution of OTs using

an occupation-based theoretical framework for guiding care in an Army COSC detachment.

OCCUPATIONAL THERAPY'S ROLE WITHIN COMBAT OPERATIONAL STRESS CONTROL

In the treatment of all persons with mental health issues, the AOTA describes occupational therapy's distinct contribution as "grounding in occupation" and further that the goal of any occupational therapy intervention is to "build new or enhance existing skills, create opportunities, and modify or adapt the environment or activity to enable participation in life".⁶ Similarly, published literature related to Army occupational therapy's role in the COSC states that occupational therapy's distinct contribution in the COSC is to "evaluate the service member's occupational performance and to implement interventions to enhance performance".¹³

In the military, combat readiness is a service member's primary occupation and therefore, forms the basis of an COSC OT's primary role.¹⁴ The Army defines readiness as "the foundation of every unit's ability to deliver overmatch

on the battlefield", acknowledging that each service member's individual level of readiness contributes significantly to overall unit readiness. Further, the Army identifies five domains of readiness: (1) physical, (2) nutritional, (3) sleep, (4) spiritual, and (5) mental.⁸ Mental readiness is described as the "exceptional mental flexibility and endurance, outstanding self-initiative and superior judgment required in combat".⁸ In times of war, dysfunctional engagement (poor performance in the occupation of readiness) may occur from manifestations of combat stress. Ultimately, such dysfunction can carry the risk of defeat and death for service members experiencing COSRs and their unit members.

Combat operational stress control (COSC) OTs provide consultation and preventative interventions to entities at all levels, including theater commanders, entire units, and individual service members. The COSC OTs work in either group or individual settings, or both, with service members to restore or build skills. These skills are then applied as a scaffolding to manage maladaptive reactions to combat stress as they occur. Table 1 describes common occupational therapy offerings in a COSC with included intervention techniques.

Table 1. Occupational Therapy Practice Framework Definitions Applied to Combat Operational Stress Control Functions^a

Intervention Type	Description	Examples
Occupations	Daily events that are meaningful to service members	<i>Service member</i> Clearing and disassembling a weapon utilizing cognitive techniques taught by OT to correctly sequence the steps
		<i>Unit</i> OT-led morning physical fitness group
		<i>Population</i> OT guides theater commanders in policies to address restorative sleep for deployed service members
Activities	Components of occupations, intervention activities support development of performance skills to enhance readiness	<i>Service member</i> Service member participates in shuttle sprint exercise programmed by OT, to improve reaction times
		<i>Unit</i> Unit members complete obstacle course led by OT to develop physical strength for war-related tasks
		<i>Population</i> OT assists theater commander in prioritizing METT-TC, for analysis during operational planning.
Functional groups, Activity groups, Task groups, and Social groups	Groups used in organizational setting that allow service members to explore and develop skills for: self-regulation, stress reduction, teamwork, leadership, relationships, effective communication, managing interpersonal conflicts, anger management, deep hygiene, homesickness, coping with the loss	<i>Service member</i> OT guides service member through a deep breathing technique to promote relaxation after a stressful mission
		<i>Unit</i> Unit members participate in an OT-led mindfulness-based, stress reduction class to encourage downregulation after a traumatic event
		<i>Population</i> OT consults with theater commanders to develop policies that will allow time for participation in leisure activities, explaining the importance of occupational balance

^aDefinitions derived from *Occupational Therapy Practice Framework: Domain and Process*, 4th ed.¹⁵

THE PERSON-ENVIRONMENT- OCCUPATION-PERFORMANCE MODEL

Occupational therapists use their skills, experiences, and knowledge to select an appropriate theoretical framework to apply to client encounters, to guide in the selection of “relevant screening and assessment procedures to identify interests, priorities, strengths, needs, problems, and concerns regarding clients’ occupational engagement and successful performance of daily life tasks”.⁶ Many theoretical frameworks are appropriate for use in a COSC setting. One such framework is the Person-Environment-Occupation-Performance (PEOP) Model.²

The PEOP Model acknowledges the influence of environment as a barrier or potential facilitator of one’s occupational performance. Because military culture is rich with traditions, organizational conventions, and hierarchical structure, a service member’s occupational performance is influenced and, at times, determined by the culture of the unit or, more specifically, the attitudes and beliefs of the leaders in their chain of command. Bass et al described the interaction of the environment as “extrinsic factors that may enhance or limit a person’s occupational performance, and include culture, social determinants, social support and social capital, education and policy”.¹⁶ However, PEOP submits that every person is motivated to master his or her environment and that unique personal factors will also influence performance.¹⁶

Developed in 1991, the PEOP model has undergone many important changes that reflect knowledge advancement since that time. Today, the model consists of four critical variables that influence participation and engagement: (1) occupations, (2) occupational performance, (3) person factors, and (4) environment factors. The model also encourages systematic evaluation and intervention processes to ensure a top-down client-centered approach.¹⁶ The process consists of: (1) the elicitation of a client’s narrative (their personal story), and their own

perceived strengths and weaknesses; (2) an assessment and evaluation phase; (3) an intervention phase; and (4) outcomes.¹⁶ The model is best exemplified by Figure 1. Given the paucity of literature describing the OT’s role in COSC using the PEOP model, a case study exemplar using the PEOP model in current COSC operations is described below.

CASE STUDY USING PERSON-ENVIRONMENT- OCCUPATION-PERFORMANCE

Occupational therapists in COSCs work in far-forward environments and share many of the same combat and operational constraints faced by service members. The therapists engage in daily physical fitness and other work-related tasks expected of deployed service members, such as weapon and vehicle maintenance. One day, while unpacking equipment from a trailer with her team, the COSC OT heard some shouting in the distance. SSG B.O., a 26-year-old infantryman from San Bernardino, California, appeared to be in a heated discussion with three of his subordinates. The OT overheard part of the confrontation, learning that SSG B.O.’s squad members had been assigned the task of cleaning and performing maintenance on 20 weapons that were used in a firefight the previous week—a firefight in which SSG B.O.’s best friend, SGT R., was killed in action. SSG B.O. was not pleased with the haphazard care that the junior service members in his squad demonstrated while performing maintenance on the weapons. The OT witnessed SSG B.O. yelling and verbally insulting the three subordinate service members. The OT was later told that, for hours that evening, SSG B.O. had his service members load and carry sandbags in 110 °F weather as a form of punishment for lack of attention-to-detail with cleaning and maintaining serviceability of the assigned weapons.

The day after the encounter, SSG B.O. approached the COSC requesting to visit the Soldier Restoration Program (SRP) at the advice of his Commander. The OT recalled the encounter from the previous evening and considered various theoretical frameworks which she might use to guide her therapeutic relationship with SSG B.O. before selecting the PEOP Model. The OT began by gathering data from SSG B.O. through his personal narrative.

SSG B.O.’S NARRATIVE

SSG B.O. explained to the OT that he had been under an exceptional amount of stress lately. He had been in theater for 6 months and had missed the birth of his youngest child, which caused him some marital distress. He felt like he only had one friend in whom he could confide, SGT R., who was killed in action the

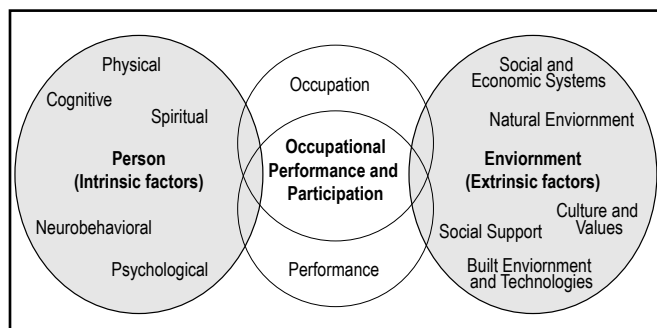


Figure 1. Example of the Person, Environment, Occupation and Performance Model. Derived from *Occupational Therapy: Performance, Participation, and Well-Being*.¹⁷

week prior to this OT evaluation. SSG B.O. was also involved in the firefight and felt some sense of responsibility for his friend's death, as his own weapon had malfunctioned during the firefight leaving him unable to return fire. Since then, he has had difficulty sleeping and is distracted by intrusive memories of these events. He has been reprimanded by his commander for failing to send reports on time and admits he has been taking his grief out on his subordinates. The OT listened actively, offered emotional support, and acknowledged how difficult the situation must be for him. She assured him that they would work collaboratively to process his experiences after further information gathering. The OT considered several assessments she might use to gather more information from SSG B.O. before selecting the Occupational Circumstances Assessment Interview and Rating Scale (OCAIRS). Figure 2 provides examples of the PEOP variables identified by the OT from SSG B.O.'s narrative, which were used to guide the OT assessment and selected interventions.

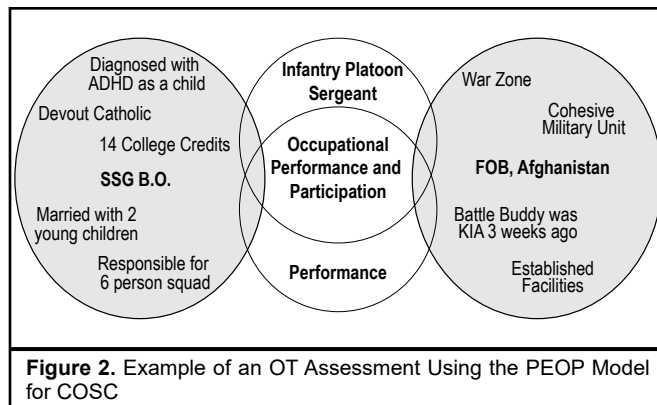


Figure 2. Example of an OT Assessment Using the PEOP Model for COSC

ASSESSMENT AND EVALUATION PHASE

Conceptually, the OCAIRS was created based upon principles of another framework commonly used by OT: the Model of Human Occupation (MOHO).¹⁸ There are distinct theoretical differences between the MOHO and the PEOP. The MOHO (while recognizing environmental contributions to occupational performance) places emphasis on intrinsic attributes of the person themselves while the PEOP places equal weight on the person, the occupation, and the environment in which the person performs the occupation.^{16,18} Both models are well researched and considered to be based upon the best available evidence.^{16,18}

Despite being created for the MOHO, the OCAIRS is consistent with the concepts of PEOP and useful for

assessment of service members experiencing combat stress. The OCAIRS consists of a semistructured interview that uses a 1 to 4 rating scale to examine roles, habits, personal causation, values, interests, skills, short- and long-term goals, interpretation of past experiences, physical environment, social environment, and readiness for change.¹⁹ The assessment has been shown to have sufficient concurrent validity and excellent interrater reliability.¹⁹⁻²¹ Further, the OCAIRS has shown occupational therapy-dose-dependent changes in behavioral health settings using theories other than MOHO, and also include narrative-informed, occupation-based concepts of care (like the PEOP).¹⁹⁻²¹

When used with SSG B.O., the OCAIRS provided a framework for a semistructured interview that guided the therapist in the collection of important information from a series of questions. As SSG B.O. provided his answers, the therapist rated the quality of responses as either facilitating (F), allowing (A), inhibiting (I), or restricting (R) of SSG B.O.'s role as a platoon sergeant and, subsequently, his level of combat readiness.

The assessment highlighted some key features of SSG B.O.'s struggles. For example when the therapist asked, "*What is the biggest challenge you are currently facing?*", SSG B.O. admitted that he has been struggling with the loss of his friend and had not yet come to terms with it. When asked, "*What do you value most in your life?*", he provided information about his spiritual upbringing and how the forward operating base to which he is currently assigned had no options for spiritual services. Several areas were highlighted in the interview which *restricted* SSG B.O.'s effectiveness as a platoon sergeant and subsequently, the overall readiness of his squad. For example, when asked "*Has your daily routine changed over the last 6 months?*" he noted that prior to deployment, he had been attending services at the local chapel regularly with his family and is unable to do so at his forward operating base. He also endorsed only four to five hours of sleep per night due to intrusive thoughts about his friend, stress from missing the birth of his child, and feeling like an absent father. Likewise the OT assisted SSG B.O. in recognizing that he already possessed some personal attributes that were rated as *facilitating* and *allowing*, and that together those could work to strengthen, further helping him process the death of his friend. After she completed rating SSG B.O.'s narrative interview, the OT arrived at a score of (2), indicating a need for OT intervention to restore/improve participation. Figure 3 provides an example of the service member ratings using OCAIRS.

OCAIRS RATING KEY

- [F] Facilitates: facilitates participation in occupation
 [A] Allows: allows participation in occupation
 [I] Interferes: interferes with participation in occupation
 [R] Restricts: restricts participation in occupation

NAME: SSG B.O. DATE: 22 Sep2022

Roles	Habits	Personal Causation	Values	Interests	Skills	Short Term Goals	Long Term Goals	Interpretations of Past Experiences	Physical Environment	Social Environment	Readiness For Change
F	F	F	F	F	F	F	F	F	F	F	F
A	A	A	A	A	A	A	A	A	A	A	A
I	I	I	I	I	I	I	I	I	I	I	I
R	R	R	R	R	R	R	R	R	R	R	R

Need for Occupational Therapy

4	Shows positive occupational participation, no need for OT
3	Need for minimal intervention/ consultative OT Services
2	Need for OT intervention indicated to restore/ improve participation
1	Need for extensive OT intervention indicated to improve participation. Referral for follow-up services also recommended.

Figure 3. Example of a completed OCAIRS rating for service member. The example used here, as described in the case study, provides an example of how an Occupational Therapist might complete the rating of a narrative interview.

INTERVENTION

Together, the OT and SSG B.O. created an action plan to achieve their collaborative goals of: (1) engaging in activities that promote processing and grief work and (2) developing habits, roles, and routines that would ensure a successful return to his role as a platoon sergeant, upon completion of his time with the COSC. His action plan included activities such as: drafting a letter to SGT R.'s wife, preparing a speech to deliver at the in-theater memorial, rehearsing the speech with the OT to practice managing his composure, creating videos of himself reading bedtime stories to send to his wife and children, creating a mental checklist to assess himself and his mood when interacting with his subordinates, tactical deep breathing exercises, identifying two other service members with whom he might have things in common and to whom he could confide, coming up with a checklist of standards to provide to his subordinates which would clear up any confusion about the quality of weapons maintenance, and planning an obstacle course that would be used to restore the cohesion and morale amongst members of his squad. For the next several days, the OT and SSG B.O. worked diligently to complete his action plan.

OUTCOME

At the end of his time in the restoration center, SSG B.O. was grateful for the opportunity to separate himself from the mission for a few days, which allowed him to prioritize his own needs. He was eager to return to his squad and was appreciative of the services he received from the COSC OT. Collaboratively, they decided that he would return in four weeks for a follow-up to discuss his progress and identify any unmet or new needs.

When SSG B.O. followed up with the therapist, he provided her with a brief narrative of his life over the past month. He felt like things had been steadily improving with his wife and she and their children had enjoyed the videos. He was happy to have made it through SGT R.'s memorial service and even had a telephone conversation with SGT R.'s wife, which had provided him with some closure. He felt as if he was on a good trajectory with his subordinates and was working to regain their trust and respect. When the therapist readministered the OCAIRS, her final rating this time was a [1] indicating positive occupational participation and no current need for OT. He was formally discharged from OT but was invited to attend a bi-weekly lunch provided by the COSC, where

service members have an opportunity to continue to fellowship with one another and receive ongoing preventative education from the multidisciplinary members of the COSC team.

CONCLUSION

While many theoretical frameworks might be beneficial in the management of combat stress, the PEO is especially useful because it considers the influence of the complex interactions of the person, the environment, and the occupation. Service members face many unique military environmental factors that may at times heavily influence their occupational engagement. Selecting a theoretical framework is essential for COSC OTs to help service members improve occupational performance and maintain combat readiness.

Reference

- Ong E, Anantham D. The medical humanities: reconnecting with the soul of medicine. *Ann Acad Med Singap*. 2019;48(7):233-237.
- Haertl K, Christiansen C. A contextual history of occupational therapy. In: Schell B, Gillen G, eds. *Willard & Spackman's Occupational Therapy*. 13th ed. Wolters Kluwer Health; 2018.
- Gutman SA. Influence of the US military and occupational therapy reconstruction aides in World War I on the development of occupational therapy. *Am J Occup Ther*. 1995;49(3):256-62. <https://doi.org/10.5014/ajot.49.3.256>
- Low JF. The reconstruction aides. *Am J Occup Ther*. 1999;46(1):38-43. doi:10.5014/ajot.46.1.38
- World Federation of Occupational Therapy. Position statement: occupational therapy and mental health. Published September 2019. Accessed November 14, 2022. <https://wfot.org/resources/occupational-therapy-and-mental-health>
- Mental health promotion, prevention, and intervention in occupational therapy practice. *Am J Occup Ther*. 2017;71(2):1-19. doi:10.5014/ajot.2017.71.6S03
- Department of the Army. *Field Manual (FM) 4-02 Army Health System*. Washington, DC: Department of the Army. Published November 17, 2020. Accessed September 26, 2022. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN35791-FM_4-02-001-WEB-3.pdf
- Department of the Army. *Field Manual (FM) 7-22 Holistic Health and Fitness*. Washington, DC: Department of the Army. Published October 8, 2020. Accessed September 26, 2022. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30714-FM_7-22-000-WEB-1.pdf
- Dailey JI, James VL. Evolution of the combat and operational stress control detachment. *US Army Med Dep J*. 2014;8-13.
- Department of the Army. *Army Techniques Publication (ATP) 4-02.05, C1 Casualty Care*. Washington, DC: Department of the Army. Published August 14, 2020. Accessed September 26, 2022. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30121-ATP_4-02.5-001-WEB-3.pdf
- Department of the Army. *Army Techniques Publication (ATP) 4-02.8, C1 Force Health Protection*. Washington, DC: Department of the Army. Published August 14, 2020. Accessed September 26, 2022. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30124-ATP_4-02.8-001-WEB-3.pdf
- American Occupational Therapy Association. About Occupational Therapy. Accessed September 26, 2022. <https://www.aota.org/about/for-the-media/about-occupational-therapy>
- Smith-Forbes E, Najera C, Hawkins D. Combat operational stress control in Iraq and Afghanistan: Army occupational therapy. *Mil Med*. 2014;179(3):279-84. doi:10.7205/MILMED-D-13-00452
- Erickson MW, Brininger TL, Newton SM, Mattila AM, Burns, JP. U.S. Army occupational therapy: Promoting optimal performance. In: Ritchie E, ed. *Combat and Operational Behavioral Health*. Washington, DC: Borden Institute. 2011:357-74.
- Occupational Therapy Practice Framework: Domain and Process-Fourth Edition. *Am J Occup Ther*. 2020;74(2):1-87. doi:10.5014/ajot.2020.74S2001
- Cole MB, Tufano R. The Person-Environment-Occupation-Performance Model. In: Cole MB, Tufano R, eds. *Applied Theory in Occupational Therapy: A Practical Approach*. 2nd ed. Slack Incorporated; 2019:127-137.
- Kielhofner G. *Model of Human Occupation: Theory and Application*. 4th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2009.
- Christiansen C, Baum CM, Bass, JD, eds. *Occupational Therapy: Performance, Participation, and Well-Being*. 4th ed. SLACK Incorporated; 2015.
- Forsyth K, Deshpande S, Kielhofner G, Henriksson C, et al. *A user's manual for the occupational circumstances assessment interview and rating scale*. Version 4.0. Chicago, IL: Model of Human Occupation Clearinghouse, Department of Occupational Therapy, College of Applied Health Sciences, University of Illinois at Chicago; 2006.
- Wasmuth S, Wilburn VG, Hamm JA, Chase A. Comparing narrative-informed occupational therapy in adult outpatient mental health to treatment as usual: A quasi-experimental feasibility study with preliminary treatment outcomes. *Occup Ther Ment Health*. 2021;37(1):56-71. doi:10.1080/0164212x.2020.1845276
- Hemphill BJ, Urish CK. *Assessments in Occupational Therapy Mental Health: An Integrative Approach*. 4th ed. Thorofare, NJ: Slack Incorporated; 2020.

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Cognitive Orientation to Daily Occupational Performance Occupational Therapy Practice Model in Combat and Operational Stress Control

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ABSTRACT

US military service members (SMs) undertake critical missions and perform their occupations in austere environments to defend our nation. Stressors associated with these missions frequently expose them to combat and operational stress reactions (COSR) and behavioral health (BH) disorders. Combat and operational stress control (COSC) is essential in managing COSR and SMs' overall BH in garrison and deployed settings. US Army occupational therapists (OTs) who serve in COSC detachments provide unique interventions focusing on occupational performance, enabling SMs to remain deployable. US Army OTs serving in COSC units provide interventions to develop cognitive strategies to facilitate SM's occupational performance and mission readiness.

OTs assigned to COSC units may use a discipline-specific framework such as the Cognitive Orientation to daily Occupational Performance (CO-OP) when working with SMs with COSR. Using the CO-OP model guides OTs in collaborative evaluation and interventions with client-centered goals and cognitive strategies to facilitate participation in meaningful occupations. The OT evaluation process may involve outcomes in the Menu Task, Canadian Occupational Performance Measure, and Performance Quality Rating Scale (PQRS). Cognitive strategy development uses domain-specific strategies, enabling principles, and an SM-specific OT intervention format. Generalization and transfer of learned skills occur through continued global cognitive strategy and involvement of trusting relationships. This article discusses the implications of the CO-OP framework used by the US Army OTs serving in COSC units and its application to SMs.

BEHAVIORAL HEALTH OF THE UNITED STATES MILITARY SERVICE MEMBERS

The US active duty military includes 1 319 243 SMs who train and deploy to defend the nation and protect the "American way of life".¹ Military service exposes SMs to harsh environments and physical and psychological stressors. The US Army Field Manual (FM) 4-02 Army Health System defines COSR as the stress reactions in the military unit environment during combat or operational context that are natural responses to stress in abnormal situations within the combat environment.² Exposure to stressors and subsequent COSR may influence the SM's mental well-being and overall health.³ A recent US Army Public Health Center report revealed that 15% of US Army Soldiers had a diagnosed BH disorder. The most common diagnoses reported were adjustment disorder, anxiety disorder, mood disorder, substance use disorder, and post-traumatic stress

disorder (PTSD).⁴ BH concerns can compound COSR and degrade the SM's cognitive, mental, physical, and occupational performance. The combination of these significant performance deficits can lead to decreased unit morale and cohesiveness, individual and unit readiness, and overall combat effectiveness of the US Military.⁵

COMBAT AND OPERATIONAL STRESS CONTROL MISSION

The US Army has recognized the significant effect of COSR over the years of modern warfare. As a result, the Army developed COSC units to prevent, treat, and manage COSR and their related BH.⁵ The COSC mission is to enhance adaptive stress reactions, prevent maladaptive stress reactions, assist SMs with controlling COSR, manage BH disorders, and teach warrior resiliency skills

to return SMs to duty.⁶ To achieve this mission, COSC units employ the following nine functional areas⁶:

1. Unit needs assessment (UNA).
2. Consultation and education.
3. Transition management and support in the deployment cycle.
4. Traumatic event management.
5. Reconstitution support.
6. Triage and stabilization.
7. Soldier restoration.
8. Soldier reconditioning.
9. BH treatment.

Personnel attached to COSC units include psychiatrists, psychologists, social workers, psychiatric nurse practitioners, OTs, BH technicians, and OT assistants. As a multidisciplinary team using a multifaceted approach, COSC has demonstrated its effectiveness in returning SMs to duty, improving absenteeism, and decreasing distress during wartime and peacekeeping missions.⁷

ROLE OF OCCUPATIONAL THERAPISTS IN COMBAT AND OPERATIONAL STRESS CONTROL

Military OTs have been part of the COSC unit since 1990. OTs use everyday activities therapeutically to enhance person, group, or population participation within relevant contexts.⁸ US Army OTs assigned to COSC units possess a unique role in addressing the nine functional areas, focusing on a holistic analysis of the SMs' participation in their occupations within their environment. COSC OTs analyze the SM and the units' occupations, environments, and personal factors to create interventions addressing functional performance. COSC OTs are skilled in the following areas that guide the therapeutic process with an end goal of returning SMs to duty after a COSR experience^{9,10}:

- Analyzing occupational performance.
- Analyzing specific tasks.
- Analyzing, selecting, and applying occupations (activities) as therapeutic media.
- Modifying the environment.
- Developing and sustaining an SM role identity.
- Using one's personality, insights, and perceptions in a therapeutic way ("therapeutic use of self").¹¹
- Matching the task or job to the SM.

The OT process is distinct from other professionals within the COSC, as COSC OTs focus on SM's function and occupational performance rather than psychopathology or

symptoms.¹¹ More specifically, the primary functional areas in which OTs are involved include soldier restoration and reconditioning.¹² While COSC OTs are mainly in charge of the soldier restoration and reconditioning during deployments, their efforts and collaboration expanded to all nine functional areas of the COSC.

EVIDENCE SUPPORTING OCCUPATIONAL THERAPISTS IN COMBAT AND OPERATIONAL STRESS CONTROL

The outcomes presented in the literature for COSC OTs are SM return to duty rates and increased occupational performance. Smith-Forbes et al¹² reported a 95% to 98% return to duty rate for SMs treated in the restoration center in Iraq and Afghanistan from 2007 to 2009. COSC OTs in the Freedom Restoration Clinic in the Afghanistan theater of operations worked with individual SMs on re-establishing self-care routines (eating and sleeping), and with groups of SMs on psychoeducation on coping and resilience, stress management and control, problem-solving, and relationship maintenance.¹³ Judkins and Bradley¹³ used the Outcome Questionnaire 45.2 (OQ 45.2), which measures symptoms of distress in three subscales: symptom distress, interpersonal relations, and social role. These authors reported statistically significant improvement in SM's total OQ-45.2 scores between pretreatment ($M = 81$, $SD = 29$) and posttreatment ($M = 55$, $SD = 29$) in the OT-led restoration program ($p < .001$) after participation in their 3-day program. The most utilized skills learned from this program were anger management, goal setting, resiliency, stress management, and positive thinking. In this study, 56% of SMs reported using the techniques directly learned from the Freedom Restoration Clinic.¹³ As noted from the results of this study, the interventions that targeted cognitive functional changes and strategies to improve their occupational performance and return to duty had the most carry-over of skills. For example, COSC OTs used cognitive restructuring to manage SMs' anger and introduced cognitive flexibility skills to build their resiliency. Therefore, the guiding principles and practice framework of OT service delivery in COSC should focus on the cognitive aspect of skill development and application.

THE COGNITIVE ORIENTATION TO DAILY OCCUPATIONAL PERFORMANCE PRACTICE MODEL

The CO-OP OT practice model emerged in 2001 as a promising practice model for OT in evaluating and treating children with developmental coordination disorders (DCD).¹⁴ The CO-OP model is "a top-down, task-oriented, client-centered approach that uses an iterative process of dynamic performance analysis and the guided discovery to enable individuals to identify cognitive strategies that will improve performance."¹⁵ The objectives of the CO-OP model are skills

Table 1. The CO-OP OT Model Key Features Description

CO-OP key features	Description
Client-centered, occupation-focused goals	Collaboratively, developed occupation-based goals
Dynamic performance analysis	Direct observation of the client's performance or reported performance; active and iterative process
Cognitive strategy use	Strategies target global or domain-specific cognition
Guided discovery	Active engagement of the client in the discovery and learning process of their deficits and cognitive strategy use
Enabling principles	Promote learning, generalization, and transfer of skills
Significant other involvement	Support the client's generalization and transfer of strategies/skills in everyday routines
Intervention format and structure	Session sequence, format, and materials used to support the implementation of cognitive strategies.

CO-OP: Cognitive Orientation to daily Occupational Performance; OT: occupational therapist

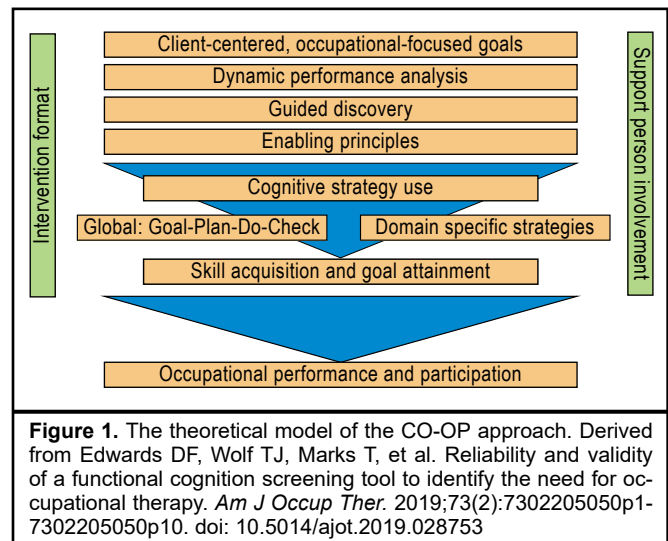
acquisition, strategy use, generalization of learned skills and strategies, and transfer of learned skills. The OT and client achieve these objectives through the following activities¹⁵:

- Developing client-centered, occupation-focused goals.
- Conducting dynamic performance analysis (DPA).
- Applying cognitive strategies.
- Using guided discovery.
- Employing enabling principles.
- Involving significant others.
- Providing intervention format and structure.

Table 1 shows a detailed description of these key features in the CO-OP model.

Implementing cognitive strategies is an iterative process involving global cognitive problem-solving and domain-specific strategies. The global cognitive problem-solving strategy employed uses the Goal-Plan-Do-Check (GPDC) format. During the OT's initial evaluation or intake, DPA identifies performance breakdowns. From the DPA, the client and OT set functional, occupation-specific goals to target cognitive performance breakdowns. Once *Goals* are set, the OT and client collaboratively *Plan* and identify which cognitive domain-specific strategy to use. The strategies are specific and target occupations or performance deficits. Guided discovery then teaches the client how to implement the strategy. The client will then apply the strategy to a particular skill (Do) and determine if the skill acquisition is complete (Check). Once the client has acquired the skill, employing strategies in real-world situations and transferring learned skills and strategies to novel tasks can occur.¹⁶ Figure 1 depicts the theoretical model of the CO-OP approach.

Although the CO-OP model has been studied extensively in pediatric populations, it has also been implemented for



adults with cognitive deficits from a stroke or traumatic brain injury and has improved occupational performance and satisfaction.¹⁷ Although various outcome measures assess skill acquisition, strategy use, and generalization/transfer of learned skills, the CO-OP model has consistently transferred to other environments and situations in children and adults with cognitive dysfunction.¹⁸ Common outcomes of CO-OP include the following¹⁸:

- DPA,
- cognitive strategy use,
- goal achievement,
- metacognition,
- self-regulation,
- self-efficacy,
- impairment reduction, and
- meaningful daily life outcomes.

Although theoretical and empirical evidence exists for CO-OP, no study describes, explains, or evaluates the effects of CO-OP in a military population. This article proposes the use of the CO-OP model as a guiding practice framework within the US Army COSC OT process. A case-study example is provided to guide the use of the CO-OP assessment method and the implementation of CO-OP in COSC's nine functional areas.

ASSESSMENTS USED IN THE COGNITIVE ORIENTATION TO DAILY OCCUPATIONAL PERFORMANCE PRACTICE MODEL

The OT process using the CO-OP model starts with determining the appropriateness of OT services to address a client's functional cognition and occupational performance. Using the CO-OP model, the OT may choose a tool, such as the Menu Task, as a performance-based screening measure of functional cognition.¹⁹ The Menu Task requires the client to complete a set of functional tasks involving ordering food from a menu within a set of rules. Intact executive functions are required to complete the Menu Task without errors. The Menu Task is simple to learn, quick to administer, simple to score, sensitive to mild impairments, and requires no equipment.¹⁹ All these features of the Menu Task are particularly suitable for use in deployed settings where resources can be scarce. The reliability and validity of the Menu Task have been established with comparisons against commonly used neuropsychiatric tests and with community-dwelling older adults with cognitive deficits.¹⁹

Once the client is determined at risk for functional cognitive impairment and may require a more comprehensive assessment than the Menu Task, the client may receive OT services using a CO-OP model. The Canadian Occupational Performance Measure (COPM) may serve as an evaluation tool for the collaborative construction of the occupational profile and goal setting in the CO-OP model.²⁰ COPM assesses the client's occupational performance problems in three domains: personal care, productivity, and leisure. The client rates each occupation identified in each domain on importance, performance, and satisfaction. The overall combined score will indicate the level of occupational performance problems for the client.²⁰ This tool has been validated and tested for reliability in the literature and has shown its utility in intervention processes within the CO-OP model.¹⁶

The PQRS is an observer-rated scale that measures the client's quality of occupational performance.¹⁶ The general version of PQRS (PQRS-G) measures the overall quality of the client's performance in an activity of choice. In contrast, the PQRS with specific operational definitions (PQRS-OD) measures the performance quality

by operationally defined standards. The ratings of the activities can range from 1 to 10, where a higher rating indicates better completeness and quality of performance or product. The psychometric property of PQRS has been established for reliability, convergent validity, and internal responsiveness for the two scoring systems in adults with stroke or children with DCD.²¹ Within the CO-OP model, PQRS can serve as an outcome measure that assesses the client's functional performance and checks for change (progress) in a particular activity of interest.

The previously described screening and assessment tools in the CO-OP model align well with the iterative problem-solving strategy of the GPDC. The initial OT evaluation involving the Menu Task, COPM, and PQRS provides an opportunity to analyze the client's breakdown in cognitive function during a meaningful activity, thus allowing the client and OT to develop personalized goals and treatment plans - fulfilling the goal and plan sections of GPDC process. As the client continues to develop cognitive strategies to improve occupational performance, a repeated PQRS may serve as part of the DPA and ongoing *Do* and *Check* processes.

IMPLEMENTATION OF THE COGNITIVE ORIENTATION TO DAILY OCCUPATIONAL PERFORMANCE PRACTICE MODEL IN COMBAT AND OPERATIONAL STRESS CONTROL

US Army OTs assigned to COSC units engage with the garrison or deployed units by providing their unique focus on the occupations and occupational performance of the SMs that comprise them. COSC OTs may intervene in all nine functional areas of the COSC; however, their involvement may not require completing the entire OT therapeutic process. As a significant contributing member of the COSC, OTs may employ applicable features of the CO-OP model as appropriate within the functional areas. For example, COSC OT may utilize DPA within the UNA to assess the occupational performance of the unit. The commanders may value the result of the DPA, as it will involve a direct report of the occupational performance of the SMs and identify the performance breakdowns that will limit the unit's combat effectiveness. Once the UNA identifies the unit's specific needs, consultation and education may follow by utilizing collaboratively developed client-centered, occupation-focused goals. SMs participating in restoration and reconditioning programs could be fully immersed in all features of the CO-OP model as the OT process will take place in its entirety (ie, evaluation, goal setting, intervention, re-assessment). Table 2 shows the application of the CO-OP model to the COSC's nine functional areas.

Table 2. The Key Features of the CO-OP Model Application to COSC's Nine Functional Areas

	Client-centered, occupation-focused goals	Dynamic performance analysis	Cognitive strategy use	Guided discovery	Enabling principles	Significant other involvement	Intervention format and structure
Unit needs assessment	x	x		x			
Consultation and education	x	x	x				
Restoration	x	x	x	x	x	x	x
Reconditioning	x	x	x	x	x	x	x
Traumatic event management	x	x	x	x		x	x
Reconstitution support	x	x	x			x	
Transition management	x	x	x			x	
Triage and stabilization	x	x		x			
Behavioral health treatment	x	x	x	x	x	x	x

CO-OP: Cognitive Orientation to daily Occupational Performance; COSC: combat and operational stress control

MILITARY CLINICAL SCENARIO

J.M. was a 26-year-old male Army staff sergeant on active duty. He was an infantryman with 7 years in service and an exemplary record. Recently, he began experiencing relationship issues with his fiancé. She engaged in an affair and left him for another person about a month before this clinical scenario. During this process, his fiancé withdrew all the SM's savings, which he planned to use to buy a house. He had no family nearby and lived alone in an off-base apartment. As a result of these stressors, the SM had difficulty falling asleep and was only sleeping 3 to 4 hours per night. He blamed himself for not mending his relationship with his fiancé sooner and worried about his financial future. His work performance degraded to a point where his platoon leader started to notice. He was late to work, often seemed distracted, and frequently forgot his assigned duties and deadlines. He also fell asleep on his drive home from work and was involved in a motor vehicle accident. His platoon leader suggested that J.M. seek help from the nearby COSC.

J.M. presented to the local COSC Restoration and Reconditioning Center led by a US Army OT. His initial evaluation included an intake interview, the Menu Task, COPM, and PQRS using a weapon assembly and disassembly activity. The DPA occurred with J.M.'s performance during weapon assembly and disassembly for the OT to evaluate performance breakdowns. The OT videotaped J.M.'s performance using J.M.'s smartphone for later development of cognitive strategies. J.M.'s Menu Task results were below the cutoff score of 6/11 with

a time of 205 seconds. Using the COPM, he indicated decreased performance and satisfaction in personal care (sleep) and productivity (work and taking care of his home environment) domains. J.M. scored 6/10 on PQRS (100% task completion with poor performance). The DPA of his performance during PQRS revealed deficits in the cognitive domains of attention, sequencing, and visuomotor coordination.

Based on the assessment results, the COSC OT decided to use the CO-OP model to devise J.M.'s intervention plan. Table 3 describes the overall CO-OP model application with J.M. J.M. and the OT created the following four occupation-based, client-centered goals:

1. J.M. will complete the weapon assembly/disassembly task within 2 minutes using cognitive strategies.
2. J.M. will create and apply three strategies within his routines to improve his sleep to 7 hours per night.
3. J.M. will complete his work duties without incidents of correction by his superiors.
4. J.M. will improve his satisfaction with his household management to 10/10 on COPM.

The OT and J.M. initiated guided discovery using the videotape from the DPA. During guided discovery, the OT and J.M. identified that his performance breakdowns were due to J.M. losing focus during the task, becoming frustrated with his mistakes, and having an overall sluggish feeling when using his hands. J.M. also discussed how worry about his future and anger toward his fiancé may impact his sleep

Table 3. Example of CO-OP Model Implementation with a Military Soldier

CO-OP key features	Strategy/principle	Application to case study
Client-centered, occupational focused goals		Identified occupations to focus on from OT evaluation – weapon management, sleep, work, and household management. Specific goals were developed collaboratively for each occupation to be met in 6 weeks.
Dynamic performance analysis		Weapons assembly and disassembly task was videotaped and reviewed together with J.M. Identified performance breakdowns
Cognitive strategy use	<i>Global cognitive strategy – GPDC</i>	
	Goal	J.M. will perform the weapon assembly/disassembly task in 2 minutes using cognitive strategies
		J.M. will create and apply three strategies in his routines to improve his sleep to 7 hours/night
		J.M. will complete his work duties without incidents of correction by his superiors
		J.M. will improve his satisfaction with his household management to 10/10 on COPM
	Plan	Daily practice of strategies and weekly visits with OT for a continuation of strategy development
	Do	J.M. implemented strategies during his work, training, and sleep routines daily
	Check	J.M. reported barriers and successes of his strategy use with OT during weekly visits
	<i>Domain-specific strategies (DSS)</i>	
	Weapons assembly/disassembly	Visual imagery and mental rehearsal
	Sleep	Sleep hygiene routine with gratitude journaling
	Work & home environment	Use a smartphone to create to-do lists and set up reminders for due dates
Guided discovery	Discussed potential reasons for J.M.'s performance breakdown and developed cognitive strategies targeting each	
Enabling principles	Encouraged daily practice of the strategies during targeted occupations: sleep, work, household management, and weapons management	
Significant others	Encouraged involvement of peers and family to generalize his strategy use and skills in everyday routines	
Intervention format and structure	Weekly OT visits at COSC: discuss barriers and successes of the cognitive strategy use and continue to develop and refine the strategies	

CO-OP: Cognitive Orientation to daily Occupational Performance; OT: occupational therapist; GPDC: goal, plan, do, check; COPM: Canadian Occupational Performance Measure; COSC: combat and operational stress control

and overall cognitive performance. J.M. and OT collaboratively developed the following cognitive strategies:

- visual imagery and mental rehearsal techniques,
- gratitude journaling,
- cognitive restructuring with sleep hygiene, and
- the use of his smartphone to create to-do lists and set up reminders for due dates.

Each week, J.M. and the OT met to discuss his progress with his cognitive strategy and modified its application based on the barriers identified. The OT encouraged J.M. to share his goals and progress with his friends or family to ensure continued strategy use and generalization.

After 6 weeks of working with the OT, J.M. met all his goals and returned to duty successfully. In a telephone

follow-up discussion two months after J.M.'s last encounter with the OT, he reported continued use of some of the strategies learned during therapy, which included journaling, mental rehearsal techniques, and reminders using his smartphone to prepare for his Army Combat Fitness Test, upcoming promotion board, and work performance.

CURRENT STATUS OF COGNITIVE ORIENTATION TO DAILY OCCUPATIONAL PERFORMANCE PRACTICE MODEL FOR MILITARY APPLICATION

Current literature supports using the CO-OP model for children or adults with cognitive dysfunction from a congenital or acquired health condition. The use of CO-OP in adults with BH concerns, or military populations has

not been established. Since the CO-OP model has demonstrated its utility in treating occupational performance deficits from cognitive dysfunctions, it sheds a favorable light on its application for military SMs with COSR or a BH diagnosis.

Summary

The CO-OP OT Model is an evidence-based OT intervention approach that targets the client's cognitive functioning and occupational performance. Cognitive impairment arising from COSR poses a significant risk to the individual SM's occupational performance and the overall unit combat readiness and effectiveness. SMs dealing with cognitive deficits from the COSR can benefit from the collaborative and iterative process of the CO-OP model to enhance their cognitive functioning. The CO-OP OT Model may also benefit the unit by impacting the unit's overall occupational performance. Further studies focusing on CO-OP OT Model outcomes in the military setting will increase the evidence base for this population.

References

- Department of Defense Manpower Data Center. *Active Duty Military Strength by Service: Strength Summary*. Updated August 31, 2022. Accessed September 26, 2022. <https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports>
- US Army. *Army Health System*. DA; November 17, 2020. FM 4-02. Change 1, July 14, 2022. Accessed January 2, 2024. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN35791-FM_4-02-001-WEB-3.pdf
- Hathaway L, Boals A, Banks J. PTSD symptoms and dominant emotional response to a traumatic event: an examination of DSM-IV criterion A2. *Anxiety Stress Coping*. 2010;23(1):119-126. doi: 10.1080/10615800902818771
- Army Public Health Center. *2021 Health of the Force Report*. APHC; 2021. Accessed September 26, 2022. <https://phc.amedd.army.mil/Periodical%20Library/2021-hof-report-web.pdf>
- Figley CR, Nash WP. *Combat Stress Injury: Theory, Research, and Management*. Taylor & Francis; 2007.
- U.S. Army. *Army Techniques Publication (ATP) 4-02.8 Force Health Protection*. DA; 2020. Updated August 14, 2020. Accessed January 2, 2024. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30124-ATP_4-02.8-001-WEB-3.pdf
- Maglione, MA, Chen C, Bialas A, et al. *Stress Control for Military, Law Enforcement, and First Responders: A Systematic Review*. RAND Corporation; RR-A119-3. As of November 10, 2022. Accessed January 2, 2024. https://www.rand.org/pubs/research_reports/RRA119-3.html
- Occupational Therapy Practice Framework: Domain and Process-Fourth Edition. *Am J Occup Ther*. 2020;74(Supplement_2):7412410010p1-7412410010p87. doi:10.5014/ajot.2020.74S2001
- Gerardi SM, Newton SM. The role of the occupational therapist in combat stress control operations. *AMEDD Journal*. 2004;2:20-27.
- Baumann ML, Brown AN, Quick CD, et al. Translating occupational therapy's current role within U.S. Army combat and operational stress control operations. *Occup Ther Mental Health*. 2018;34(3):258-271. doi: 10.1080/0164212X.2018.1425952
- Punwar AJ, and Peloquin SM. *Occupational Therapy Principles and Practice*. 3rd ed. Lippincott, Williams & Wilkins; 2000:285.
- Smith-Forbes E, Najera C, Hawkins D. Combat operational stress control in Iraq and Afghanistan: Army occupational therapy. *Mil Med*. 2014;179(3):279-284. doi: 10.7205/MILMED-D-13-00452
- Judkins JL, Bradley DL. A review of the effectiveness of a combat and operational stress control restoration center in Afghanistan. *Mil Med*. 2017;182(7):e1755-e1762. doi: 10.7205/MILMED-D-16-00311
- Missiuna C, Mandich AD, Polatajko HJ, et al. Cognitive orientation to daily occupational performance (CO-OP): part I--theoretical foundations. *Phys Occup Ther Pediatr*. 2001;20(2-3):69-81. doi:10.1080/J006v20n02_05
- Scammell EM, Bates SV, Houldin A, et al. The cognitive orientation to daily occupational performance (CO-OP): a scoping review. *Can J Occup Ther*. 2016;83(4):216-225. doi: 10.1177/0008417416651277
- Edwards DF, Giles GM, Wolf, TJ. *Functional Cognition and Occupational Therapy: A Practical Approach to Treating Individuals With Cognitive Loss*. AOTA Press; 2019.
- Saeidi Borujeni M, Hosseini SA, Akbarfahimi N, et al. Cognitive orientation to daily occupational performance approach in adults with neurological conditions: a scoping review. *Med J Islam Repub Iran*. 2019;33:99. doi: 10.34171/mjiri.33.99
- Houldin A, McEwen SE, Howell MW, et al. The cognitive orientation to daily occupational performance approach and transfer: a scoping review. *OTJR*. 2018;38(3):157-172. doi: 10.1177/1539449217736059
- Edwards DF, Wolf TJ, Marks T, et al. Reliability and validity of a functional cognition screening tool to identify the need for occupational therapy. *Am J Occup Ther*. 2019;73(2):7302205050p1-7302205050p10. doi: 10.5014/ajot.2019.028753
- Law M, Baptiste S, McColl M, et al. The Canadian occupational performance measure: an outcome measure for occupational therapy. *Can J Occup Ther*. 1990;57(2):82-7. doi: 10.1177/000841749005700207.
- Martini R, Rios J, Polatajko H, et al. The performance quality rating scale (PQRS): reliability, convergent validity, and internal responsiveness for two scoring systems. *Disabil Rehabil*. 2015;37(3):231-8. doi: 10.3109/09638288.2014.913702

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Holistic Health and Fitness: How Army Registered Dietitians are Fueling the Fight Through Tactical Nutrition

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ABSTRACT

The Holistic Health and Fitness (H2F) program integrates five domains of readiness: physical, nutritional, mental, spiritual, and sleep. Registered Dietitians (RDs) are part of the multidisciplinary H2F team and support the proactive, active, and reactive components of nutritional readiness in various settings. H2F RDs provide both general and targeted nutrition education to soldiers at an individual and group level, advise command teams and brigade medical staff on all nutrition-related matters pertinent to medical readiness, deployability, and performance optimization, and collaborate with food service entities to improve the nutrition environment in Warrior Restaurants. In addition to these nutrition-specific tasks, H2F RD responsibilities include supervision, warrior tasks and drills, and miscellaneous brigade staff officer duties. While there have been challenges associated with the implementation of H2F, these challenges have provided an opportunity for Army RDs to demonstrate creativity and adaptability in how they contribute to the health and fitness of their respective brigades. Through H2F, Army RDs have promoted a culture change that proactively aims to improve the health and fitness of soldiers.

INTRODUCTION

The Holistic Health and Fitness (H2F) program is the multidisciplinary integration of five domains of readiness: physical, nutritional, mental, spiritual, and sleep. These readiness domains are designed to improve operational performance, ensure soldier deployability and well-being, and build resilience so soldiers can deploy anywhere in the world to shape, deter, fight, and win. A fully implemented Tier 1 H2F team consists of 35 to 37 personnel, including registered dietitians (RDs) and their assistants, occupational therapists and their assistants, physical therapists and their assistants, a cognitive enhancement specialist, strength coaches, athletic trainers, and a program director located within a brigade footprint. Army RDs serve as the nutrition program directors overseeing a four-person team.

A comprehensive H2F nutrition program improves health and fitness across a performance-illness continuum, operating in the proactive, active, and reactive components. The unit's H2F nutrition program can facilitate health and human performance throughout a 20-plus-year Army career by integrating all three components.¹ Working proactively, RDs promote foundational health, including chronic disease prevention, injury risk mitigation, and immune system enhancement.

In the active component, RDs aim to improve occupational, environmental, and task-specific performance. Reactively, RDs provide medical nutrition therapy and body composition interventions. In this article, the authors explain how current Army H2F RDs are implementing nutrition across the components in various settings at the tactical or brigade level.

HOLISTIC HEALTH AND FITNESS NUTRITION IN THE GARRISON SETTING

The main proactive nutrition lines of effort in garrison include:

- Integrating with Warrior Restaurants.
- Offering nutrition classes and individual appointments.
- Teaching into the H2F Extender Course to enhance H2F knowledge.

Research supports the influence of the food environment on food choices²; therefore, RDs have joined forces with their local Warrior Restaurants, previously known as Dining Facilities (DFACs), to educate employees and customers and improve the nutrient density of available food choices. RDs strive to improve the food environment, encourage healthy food choices, and provide diet-specific options to soldiers who frequently utilize the Warrior Restaurant.

RDs are involved in nutrition education, providing soldiers with knowledge of how to hydrate, build meals, grocery shop, plan meals, and appropriately use supplements. These nutrition classes are the foundation for overall health and chronic disease prevention. This knowledge is also presented during H2F extender courses that develop the ability of leaders in the brigade to answer general health and fitness questions and guide their peers toward performance optimization.

In the active nutrition component, RDs target environmental and task-specific events to enhance soldier performance and lethality developed in the training and competitive environment. Army RDs have developed fueling and hydration plans for field training and multiple schools and competitions such as the Best Ranger Competition, Airborne School, Air Assault School, and the E3B series (Expert Field Medical Badge, Expert Infantry Badge, and Expert Soldier Badge). RD involvement has likely contributed to a noted decrease in heat injuries³ and anecdotal success from soldiers in their brigades.

Lastly, in the reactive component, Army RDs provide medical nutrition therapy and body composition counseling for soldiers in their brigade. RDs offer nutrition counseling to improve dietary habits that lead to sustainable lifestyle changes and body fat loss to battle rising Army obesity rates, which increased by 7.9% from 2019 to 2020.³ RDs also provide medical nutrition therapy for common diagnoses that do not require separation from service, such as hyperlipidemia and hypertension. Through all these initiatives in the garrison environment, H2F RDs improve soldier physical and mental well-being through food and nutrition.

HOLISTIC HEALTH AND FITNESS NUTRITION DURING COMBAT TRAINING CENTER ROTATIONS

By evaluating a unit's Mission Essential Task List, the food environment, and the soldier's individual needs, RDs can enhance a soldier's ability to accomplish the mission at Combat Training Center (CTC) rotations via nutrition education and environment modification. Before the rotation, Army RDs educate soldiers on how to use their rations to minimize energy deficits and optimize performance, recovery, and hydration strategies based on activity and expected climate and elevation. Nutrition education can be provided regarding foods to bring in addition to Meals Ready to Eat (MREs) if desired or able. RDs can also advise S-4/logistics to ensure adequate amounts and appropriate types of rations are ordered. Examples of this include advocating for three MREs per day, specific rations (eg, First Strike Rations) suited for mission demands or units with elevated energy expenditure, and carbohydrate-electrolyte packets.^{4,5} The overarching message RDs can communicate is that basic field nutrition principles are enablers to mission success and heavily impact soldier performance.

Additional strategies to optimize performance and reduce injury risk at a CTC rotation can include monitoring performance and perceived fatigue, educating on ration use to maximize energy levels, and providing mission-specific food and hydration recommendations during mission briefings. H2F presence during trying field problems is an opportunity for relationship building and for line units to see the immediate mission value of the H2F team. The perceived value builds trust and a better understanding of H2F offerings, increasing the likelihood of working with H2F for future operations. After mission completion, RDs can participate in After Action Reviews to improve future performance outcomes via environment or nutrition education changes. Other reactive strategies include reassessing body composition after completion of field training to treat for loss of lean muscle mass and educating on food practices for recovery such as adequate calories, protein, and antioxidant-rich foods.

RD support of CTC rotations is unit and mission specific. One way to support the active nutrition component is by embedding personnel at the company, troop, or battery level and assessing urine specific gravity (USG) levels via a pen refractometer.⁶ Fluid losses of 2% or more of total body weight can cause decreased mental and physical performance.⁷ RDs can also educate soldiers on rations that impact hydration, using food and liquid components to accommodate mission requirements. This benefits soldiers by providing a numeric value to their hydration status. Soldiers can objectively see how their hydration level impacts them physiologically, track trends, and note how their level changes based on fluid intake, activity level, and climate. Monitoring USG can bring awareness to the risk of performance decrements and heat injury. Soldiers with severe risk can be monitored more closely by leadership and medical personnel. Additionally, monitoring USG provides a way to make hydration a normal part of the preparation and planning process and helps leaders view fluid and ration consumption as vital to peak performance.

HOLISTIC HEALTH AND FITNESS NUTRITION DURING DEPLOYMENT

The nutrition services provided during deployment are largely dependent on several factors, including unit location, the deployed food environment, food service capabilities, operational tempo, and the overall mission. H2F RDs proactively improve deployed soldiers' nutrition status through individual and group education and multidisciplinary collaborative initiatives with brigade health professionals. While H2F RDs serve as brigade staff and provide counsel and recommendations to the brigade command team, there is an opportunity for collaboration with brigade medical providers, the unit ministry team, and behavioral health officers.

H2F RDs actively respond to soldiers' nutrition needs by engaging with the brigade food advisor and Area Support

Agency Warrior Restaurant managers to provide recommendations specific to soldiers' needs and the cultural provisions of the region. Deployed H2F RDs ensure soldiers are fueling appropriately for their environment and altitude and optimize their performance during missions. The deployed food environment can vary greatly depending on a unit's mission and current operations, and many soldiers need guidance on selecting foods when choices are limited to prevent unintended loss of lean body mass.⁸ RDs also ensure that soldiers with special dietary restrictions have access to medically appropriate meal options. Additionally, deployed H2F RDs may battlefield circulate to geographically remote locations to provide services to soldiers who may not otherwise be able to access nutrition education.

Many of the reactive nutrition services provided in the deployed environment are like those provided in garrison. Deployed soldiers are still required to meet body composition standards, and H2F RDs serve as the brigade subject matter experts for the Army Body Composition Program (ABCP). RDs provide nutrition education for soldiers enrolled in the ABCP, as well as deployed soldiers managing health conditions such as hypertension, prediabetes, and inflammatory bowel disease. As H2F teams become more integrated into the brigade, expect the role of the deployed RD to evolve and adapt to meet the needs of the unit, the soldier, and mission requirements.

OTHER ROLES FILLED BY THE HOLISTIC HEALTH AND FITNESS REGISTERED DIETITIAN

Despite having a medical specialty, Army RDs are foremost expected to be soldiers. This means engaging in daily physical readiness training with their unit and completing various training such as weapons qualifications, convoy operations, ruck marches, field training exercises, combined training exercise rotations, and deployments, to name a few. In addition to Army H2F RDs serving as soldiers and clinicians, they serve in various other roles. Army RDs are the H2F nutrition program directors, leading and supervising a team of four. As the nutrition subject matter expert, they advise the command and the brigade surgeon on all matters pertinent to nutrition. As staff officers, they are often expected to attend and present in meetings such as command and staff, health promotion meetings, profile review boards, staff synchronization meetings, and more. In most brigades, the Army RD is a captain; however, in sustainment brigades, the Army RD is typically a major, and there is a greater expectation for leadership, responsibilities, and additional duties.

As this is a novel program, career progression for H2F RDs has yet to be defined. However, an example may be to start in a brigade as a captain, and then move into a position at a sustainment brigade or Special Forces group as a major,

then move up to the division H2F director position, which an RD, occupational therapist, or physical therapist can fill. Additionally, there are opportunities to work at higher echelons, such as major commands.

CHALLENGES

The H2F nutrition programs have faced many challenges as teams are being stood up across the Army. However, these challenges allowed military dietitians to demonstrate creativity and adaptability in facing these obstacles. H2F dietitians are uniquely suited to integrate into brigade Warrior Restaurant operations, advise food service personnel on menus, develop new programs such as meal preparation programs, and conduct education within the restaurant. Some challenges H2F RDs face in integrating with Warrior Restaurants include logistical constraints of the local food supply and the impacts of personnel and operational tempos. Personnel turnover of the food service staff has slowed the implementation of new programs, brigade meal preparation programs being the best example. Army cooks have minimal nutrition education, requiring constant quality assurance to be conducted by the H2F dietitians. Additionally, RDs and brigade food service personnel must develop a productive working relationship to ensure a cohesive vision for the nutrition environment of the brigade. Strain in the relationship between RDs and food service directly impacts the progress of nutrition initiatives.

Outside of the Warrior Restaurants, the nutrition environment is an additional and often frustrating challenge. There are several chain fast-food restaurants on posts near where soldiers work and live, resulting in a lack of nutrient-dense food options in soldiers' nutrition environment.⁹ H2F RDs and even RDs in senior positions within the Department of Defense have gained little traction in changing these options. Strict regulations also prohibit fueling stations open to all soldiers due to fiscal constraints.¹⁰ Fueling stations aim to provide adequate nutrients after training sessions to promote recovery. H2F RDs strive to treat soldiers as tactical athletes, but until this regulation changes, RDs will not be fully enabled to do so.

Implementing H2F as a brigade special staff section has also forced the professional growth of military dietitians and the other H2F Medical Specialist Corps officers. Due to a combination of low Army RD inventory and talent management errors, many junior and inexperienced RDs have been asked to quickly learn how a brigade staff functions and effectively integrate H2F into training cycles. This challenge has left many H2F teams at an operational deficit while in the field or deployed. The challenges faced by H2F, and specifically the H2F nutrition programs, have provided an avenue for the RDs to exhibit their skill set and to flourish in the human performance and public health spheres.

CONCLUSION

While the H2F program is still in its infancy, Army RDs have several opportunities to significantly contribute to the health and fitness of soldiers in their respective brigades. Using a comprehensive multidisciplinary approach, H2F RDs work with their teams to promote foundational health, provide medical nutrition therapy, mitigate nutritional risks, and optimize task-specific performance. This is currently being implemented in garrison and field settings and during deployment. H2F implementation varies widely; however, there is flexibility and a degree of autonomy for the H2F team to meet the commander's intent and unit-specific demands. There are also several challenges H2F RDs face, including integrating with the Army food service program, difficulty changing the on-post food environment, and handling dynamics within the brigade setting. However, with challenges come opportunities, and Army RDs are rising to the occasion. Through the H2F system, Army RDs have created a paradigm shift to be more proactive in health and fitness versus exclusively reactive. As part of the larger brigade-level H2F program, the nutrition program systematically delivered to meet the unit's needs can improve soldier health and fitness and unit readiness and ultimately contribute to mission success.

References

1. Daigle KA, Logan CM, Kotwal RS. Comprehensive performance nutrition for special operations forces. *J Spec Oper Med*. 2015;15(4):40-53. doi:10.55460/XCD3-0RWE
2. Armstrong NJ, Serrano EE, Cole RE, Bukhari AS, Jayne JM. Barriers to nutrition interventions in Army dining facilities: a qualitative study. *Mil Med*. 2021;186(11-12):e1129-e1134. doi: 10.1093/milmed/usaa522
3. Department of Defense Health Agency. Health of the Force Report 2021. Accessed January 17, 2024. <https://health.mil/Reference-Center/Technical-Documents/2022/12/14/DOD-Health-of-the-Force-2021>
4. Combat Feeding Directorate. *Leader's Guide to Operational Rations*. CFD; 2016. NATICK PAM 30-25.
5. Headquarters Departments of the Army, the Navy, and the Air Force. *Nutrition and Menu Standards for Human Performance Optimization*. DA; 2017. Army Regulation 40-25.
6. Heilesen JL, Jayne JM. Validity of digital and manual refractometers for measuring urine specific gravity during field operations: a brief report. *Mil Med*. 2019;184(11-12):e632-e636.
7. Thomas DT, Erdmann KA, Burke LM. Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: nutrition and athletic performance. *JAND*. 2016;116(3):501-528.
8. Tassone EC, Baker BA. Body weight and body composition changes during military training and deployment involving the use of combat rations: a systematic literature review. *Br J Nutr*. 2017;117(6):897-910. doi:10.1017/S0007114517000630
9. Chukwura CL, Santo TJ, Waters CN, Andrews A. 'Nutrition is out of our control': soldiers' perceptions of their local food environment. *Public Health Nutr*. 2019;22(15):2766-2776. 10.1017/S1368980019001381
10. Department of the Army. *Army Food Program*. DA; 2019. Army Regulation 30-22.

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Attitudes, Beliefs, and Quality of Sleep Among Active Duty Soldiers and the Impact on Occupational Performance: A Mixed Methods Study

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ABSTRACT

Background: Sleep disturbances are an ongoing concern among the active duty (AD) Army community. The Performance Triad (P3), implemented in 2013, focuses on sleep education and hygiene; however, sleep disturbances remain prevalent. To date, no studies have evaluated the attitudes, beliefs, and sleep quality of AD soldiers and sleep's perceived impact on occupational performance. The purpose of this study was to identify these variables to understand how sleep is experienced in AD and its impact on performance.

Methods: This triangulation, convergence model, mixed methods study design recruited 102 AD Army soldiers aged 20 to 62 with a minimum of two years' service. Recruitment took place at Fort Sam Houston, Texas. Cross-sectional quantitative data was gathered from three self-report measures and demographic information. All soldiers were invited to participate in a semi-structured interview investigating the perceptions of sleep participation and factors that enable and limit obtainment, to which 11 soldiers agreed.

Results: Significant relationships were found between poor sleep quality, increased dysfunctional beliefs and attitudes about sleep, and decreased perceived daily function. Poor sleep quality was significant for higher caffeine consumption, while dysfunctional beliefs were significant among training locations and for alcohol use. Additionally, decreased self-efficacy was revealed to impact the sleep experience while on AD among participants. Leadership was identified as being able to change the Army's sleep culture.

Conclusions: Most study participants had poor sleep quality. Poor sleep quality demonstrated significant relationships with both dysfunctional beliefs about sleep and perceived daily performance. Additionally, self-efficacy was a primary barrier to implementing sleep hygiene principles for change in sleep for this sample population.

INTRODUCTION

Problems related to sleep are among the most frequent health complaints of adults.¹ While several hundred epidemiological studies seek to identify the prevalence of sleep complaints and disorders among the general population, it is difficult to delineate consistent prevalence percentages.^{2,3} This is at least partially secondary to articles varying in the terminology used to encompass unrestful sleep which may include but are not limited to insomnia, sleep disturbance, sleep disruption, poor sleep quality and sleep disorder. Nonetheless, research has demonstrated that one in four individuals reportedly do not sleep well, and one third of the general US population have self-reported sleep disturbances.^{3,4}

The prevalence is generally higher within the military population than reported for the general population. Taylor et al⁵ completed a study to determine the prevalence of insomnia in a large sample of AD military personnel. Of the 4,101 participants from November 2010 to June 2011, 19.9% of predeployed service members had scores indicative of insomnia on the Insomnia Severity Index (ISI).⁵ Another study by Jenkins et al⁶ found that out of 843 veterans of Operation Iraqi Freedom, Operation Enduring Freedom, and Operation New Dawn, 53.1% had clinically significant insomnia symptoms on the ISI. Additional studies report that an average of 41% to 75% of postdeployed service members describe sleep disruptions upon their return home.^{7,8} The difference in reported prevalence rates suggests a higher amount of AD military experience unrestful sleep than the general population.

Limited sleep is considered a normal part of being a soldier in deployment and garrison environments.⁹ Short durations of sleep and/or poor sleep quality may be considered acceptable within the military culture.⁷ Military duty presents environmental challenges to obtaining sleep, and studies have found that the environment, training schedules with limited sleep allowances, loud noises, uncomfortable sleeping arrangements, and elevated stress levels greatly influence the soldier's quality of sleep within combat and training.⁹⁻¹¹

Obtaining quality sleep can be difficult and addressing sleep disturbances is a unique clinical and rehabilitation challenge. This challenge is worth pursuing because decreased sleep hurts physical performance, and an individual's physical fitness level also affects sleep.^{9,12} For athletes, sleep is paramount for optimal performance and well-being.¹³ The Office of the Surgeon General initiated the Performance Triad (P3), which is a program specifically aimed at promoting optimum soldier performance.⁸ Soldiers are considered tactical athletes and, similarly to sports and exercise athletes, are expected to maintain performance at their highest ability. Education regarding sleep through the P3 includes recommending 7 to 8 of sleep per night, ending caffeine consumption 6 hours before bedtime, and resorting to additional help if experiencing sleep problems for longer than 2 weeks.¹⁴ Despite the emphasis on P3 sleep education, there remains a potential disconnect in application, especially in unique environments such as during deployments. During deployments, the recommended amount of sleep per 24-hour period is 4.5 hours; significantly less than that proposed by the P3.¹⁵

Of additional concern is the impact of sleep disturbance on occupational performance, both within deployments and garrison environments.^{12,16,17} A study demonstrated that sleep disturbances greatly impact the occurrence of occupational incidents, including falling asleep while on a shooting range, which can cause both bodily and property harm.¹⁸ Caldwell & Gilreath¹⁸ found that 73% of 145 military pilots surveyed reported widespread fatigue, and 50% reported they had fallen asleep secondary to fatigue while in the cockpit on at least one occasion. In the 2013 Military Health Advisory Team report, more than half of the soldiers who reported mission-related mistakes attributed them to sleepiness. Sleep disturbances introduce safety and risk concerns to essential personnel and equipment.

While there is a plethora of research that evaluates the occurrence and impact of sleep disturbances among the AD community, there is a paucity of current literature investigating the perceptions, attitudes, and beliefs of sleep among AD Army soldiers. The purpose of this study is to understand the current attitudes, beliefs, and quality of sleep among the AD Army community and its relation to occupational performance to influence the effective development of future occupational therapy intervention programs.

METHODS

The study design was a triangulation, convergence model, mixed methods design. Participant recruitment occurred from January 2019 to April 2019. The San Antonio Institutional Review Board (IRB) approved the protocol, reference number C.2018.149e/IRB 906488. A convenience sample of AD Army soldiers attending military education programs was recruited from a single installation with the following inclusion criteria: Department of Defense, Army soldiers on AD, between 20 to 62 years old, who had at least 2 years in service, and could read, speak, and understand English. The exclusion criteria included less than 2 years of AD service, less than 20 or greater than 62 years of age, and not currently on AD.

The outcome measures used for this study included the Pittsburgh Sleep Quality Index (PSQI),¹⁹ Dysfunctional Beliefs and Attitudes about Sleep Questionnaire (DBAS),²⁰ and the Functional Outcomes of Sleep Questionnaire (FOSQ).²¹ The subjective understanding of the participants was explored through semi-structured interviews. This study was specifically interested in the participant's lived experiences of sleep during their military careers and their views of the relationship between sleep quality and occupational performance. Prospective phenomenological investigation was used with the intent of reaching saturation of information. All study participants completed three quantitative surveys, which included outcome measures and demographic information. All participants were invited to complete a semi-structured qualitative interview.

DATA ANALYSIS

Histograms were used to determine distributions of the data. Descriptive statistics were used to summarize the data in a meaningful fashion and to identify patterns. Chi-Square, Mann-Whitney *U*, and Kruskal-Wallis tests were calculated to examine differences in demographic characteristics among groups. Relationships between outcome measure scores (PSQI, DBAS, and FOSQ) and demographic variables were determined with Chi-Square analysis.

Qualitative data gathered during the semi-structured interviews were used to provide greater credibility and cogency to the quantitative findings. Each interview was audio recorded and transcribed verbatim. Transcriptions were managed using HyperRESEARCH 4.0.3 software. This study used Colaizzi's phenomenological method of qualitative data analysis.²² The research team used triangulation to establish the trustworthiness of the qualitative data. The team completed reflective journal entries throughout the study, including bracketing and conducted peer debriefings with an assistant investigator with expertise in qualitative research to establish trustworthiness and rigor.

RESULTS

A total of 105 Army soldiers completed quantitative survey packets for this study. After review, three were excluded secondary to incomplete questionnaire completions. A final sample of 102 participants completed the quantitative portion of the study. Eleven participants agreed to participate in semi-structured interviews. Participant demographics are summarized in Table 1.

Table 1. Quantitative Sample Demographics

Characteristic	n	%
Age: mean \pm SD	34.76 \pm 6.64	
Gender		
Female	23	22.5
Male	79	77.5
Missing	0	0
Marital status		
Married	71	69.6
Separated	2	2
Divorced	15	14.7
Single	14	13.7
Grade		
E1-E4	0	0
E5-E6	84	52.9
E7-E9	3	2.9
O1-O3	10	9.9
O4-O6	1	1
Missing	4	3.9
Time in service		
2-5 years	5	4.9
6-10 years	31	31.4
11-15 years	32	31.4
16-20 years	28	27.5
21-25 years	4	3.9
Missing	2	2
Deployments		
0	21	21.6
1	28	27.5
2	19	18.6
3+	34	33.3
Most recent APFT score		
Pass	74	72.5
Fail	10	9.8
Missing	18	17.6

(Continues)

Table 1. Quantitative Sample Demographics (Continued)

Characteristic	n	%
Profile		
Yes	37	36.3
No	64	62.7
Missing	1	1
Currently use tobacco		
Yes	25	24.5
No	75	73.5
Missing	2	2
Consume alcohol		
Yes	77	75.5
No	23	22.5
Missing	2	2
Consume caffeine		
Yes	87	85.3
No	14	13.7
Missing	1	1

E: enlisted; O: officer; APFT: Army Physical Fitness Test

Statistical Analysis

The PSQI scores were categorized into two groups: those who scored 5 or less and those who scored 6 to 21. Of the 93 participants who completed the PSQI, 68 (73.1%) had poor sleep. There is currently no determination of the severity of poor sleep scores between the 6 to 21 score range. Therefore, for this study, the PSQI scores of 6 to 21 were further categorized into three groups: those who scored 6 to 10 (40, 58.8%), 11 to 15 (23, 33.8%), and 16 to 21 (5, 7.4%). Statistically significant results were found for PSQI scores of poor and good sleepers with caffeine use and caffeine amount ($p=.015$) and ($p=.026$), respectively. Additionally, caffeine use ($p=.009$) and caffeine amount ($p=.011$) were statistically significant among the three-group breakdown of poor sleepers. Only individuals who reported poor sleep quality drank five or more cups of caffeine per day. The PSQI was not statistically significant for any other demographic variable.

The DBAS-16 scores were separated into two groups: those who scored 1 to 4 and those who scored 5 to 10. The two groups of DBAS-16 scores were statistically significant for school attended ($p=.036$), pass/fail of most recent APFT ($p=.045$), alcohol use ($p=.017$), and alcohol amount ($p=.028$).

The FOSQ-10 scores were not statistically significant for any demographic variable. Further analysis for each outcome measure scores with demographic variables are in Table 2.

Table 2. Significance of Outcome Measures with Demographic Variables

	p-value ^a			
	PSQI good/poor sleep	PSQI poor sleep in 3 groups	DBAS-16 in 2 groups	FOSQ-10 in 3 groups
Caffeine use	0.015*	0.009**	0.460	0.103
Caffeine amount	0.026*	0.011*	0.179	0.165
School	0.834	0.739	0.036*	0.328
APTF pass/fail	0.574	0.842	0.045*	0.416
Alcohol use	0.464	0.628	0.017*	0.699
Alcohol amount	0.665	0.129	0.028*	0.367
Gender	0.112	0.718	0.012*	0.218
Tobacco use	0.545	0.396	0.476	0.186
Marital status	0.062	0.496	0.273	0.370
Deployments	0.467	0.674	0.452	0.404
Time in service	0.724	0.427	0.519	n/a
Rank	n/a	n/a	n/a	0.062

PSQI: Pittsburgh Sleep Quality Index; DBAS-16: Dysfunctional Attitudes and Beliefs About Sleep Scale-16; APFT: Army Physical Fitness Test; FOSQ-10: Functional Outcomes of Sleep Questionnaire-10

^aP-value for significance *p<.05, **p<.01, PSQI

Each of the three outcome measure score groupings was also explored with one another. The PSQI scores for determining poor and good sleepers were significant (p=.044) with scores on the DBAS-16 in two groups (scores 1-4 and 5-10). It was additionally significant with FOSQ-10 scores in three groups (5-10, 11-15, and 16-20) (p=.032). The PSQI scores of poor sleepers separated into three groups were also significant (p=.006) with DBAS-16 scores in two groups. The DBAS-16 in two groups were significant with FOSQ-10 scores in three groups (p<.005) and with FOSQ-10 scores in four groups (p=.023). Finally, DBAS-16 scores in five groups were significant with FOSQ-10 scores in three groups (p=.001) and FOSQ-10 scores in four groups (p=.009). Further analysis for each outcome measure scores with each other is in Table 3.

Participant Interviews

Eleven participants completed one-on-one semi-structured interviews with either the primary investigator or the assistant investigator in a private office. All interviews were conducted in person on the same day as quantitative data collection and lasted an average of 20 minutes. Three themes emerged after transcription and coding that described the lived sleep experience among AD soldiers.

The Exclusivity of Sleep on Active Duty

The first theme that emerged involved participants' perceptions and descriptions of sleep. We categorized this

Table 3. Significance of Outcome Measures to Each Other

	p-value ^a
PSQI good/poor sleep quality x DBAS-16 Dysfunctional/non-dysfunctional beliefs	0.044*
PSQI poor sleep by severity x DBAS-16 Dysfunctional/non-dysfunctional beliefs	0.006**
PSQI poor sleep by severity x FOSQ-10 daytime function	0.298
PSQI good/poor sleep quality x FOSQ-10 daytime function	0.032*
DBAS-16 dysfunctional/non-dysfunctional beliefs x FOSQ-10 daytime function	<.005**

PSQI: Pittsburgh Sleep Quality Index; DBAS-16: Dysfunctional Attitudes and Beliefs About Sleep Scale-16; FOSQ-10: Functional Outcomes of Sleep Questionnaire-10

^aP-value for significance with Pearson's Chi-Square Test *p<.05, **p<.01

theme into general sleep principles, or areas of sleep that impact all persons regardless of military affiliation, and Army-specific sleep. Participants voiced that sleep principles that civilian counterparts experience are also true for the AD Army population. These areas include sleep's impact on psychological health, mood, physical performance, cognitive performance, and interpersonal skills. Sleep also gives time for the body's processes to reset. The overarching summation

from participants was that sleep is essential for all that a person is and does.

“Um, it’s probably one of the most necessary things to live, I guess....Sleep is like the foundation of everything you do while you’re awake.” (P9.)

Beyond sleep’s impact are many barriers that can hinder restful sleep, such as family stressors, anxiety and stress, environment, responsibility, and pain. The participants voiced that the AD population’s sleep is impacted beyond general sleep principles and barriers. Many agreed that sleep is harder to obtain while on AD in comparison to civilian experiences. Furthermore, the varying environmental stressors including garrison, deployment, type of unit, mission operational tempo and leadership influence sleep obtainment. While these stressors are individualized in how they are experienced, there is a consensus that they are unique to the AD population and are experienced in addition to the barriers to sleep that civilian counterparts have.

“Of course, deployment, it’s kind of hard to sleep when rockets are falling on your head, it’s kind of hard to sleep when you’re in a truck and you’re in full kit. Do we do it? Yeah. Is it good sleep? No.” (P2.)

Moreover, the impact that decreased quantity and quality of sleep an individual may have is thought to have more detrimental effects on the AD population than the civilian population. This impact was expressed by participants in that many mission requirements have a no-fail option when lives are at stake.

“You know, nobody got on a racetrack in the Olympics, and thought, man, I might die today. You know what I mean? So we’ve got that extra stressor involved in everything that we do. And I feel like that stressor makes things just...it kinda puts it up to 11. Because you’re not just thinking, oh, you know, I need to run fast so I can win. You’re thinking, oh I need to run fast so I don’t die. And I do my job. And I, you know, my buddies don’t die.” (P9.)

The performance of a soldier and the required tasks to complete are critical to mission success. Mission success may include the safety of personnel and equipment, which are both assets to the ultimate success of the Army. Good quality and quantity of sleep were repeatedly identified as primary factors in the success of various missions. Therefore, participants valued sleep as highly important, despite their recognition of barriers to obtainment.

Soldier Performance is Directly Influenced by Sleep

The second theme that emerged during the study involved discussions of the P3 program and sleep hygiene initiatives. Additionally, this theme encompasses participant’s

views on a soldier’s ability to perform as tactical athletes and optimally perform their missions. The (P3) was implemented during many of the participants’ time in service. There was an overall expression of positive change because the P3 implementation focused on nutrition, sleep, and physical performance. However, sleep was identified as having mixed messages between the US Army Medical Command (MEDCOM) and the US Army Forces Command (FORSCOM) units. Those who have been in both types of units noted that MEDCOM is well-versed in sleep while FORSCOM units will have training on P3 that includes sleep, but with variable implementation.

“It’s hard for soldiers to believe that NCOs and officers, leaders, actually care about their sleep when they say, oh you have to be here at six o’clock for formation and just... oh well, I don’t care what time you go to bed. It, it doesn’t matter.” (P8.)

Furthermore, many voiced that sleep hygiene principles alone are not enough to make a complete change toward improved sleep and that the focus of importance is to improve the quality of sleep over the quantity of sleep.

“They wouldn’t have come up with the initiative, they wouldn’t be talking about it, they wouldn’t be trying to prevent uh, and educate, if they didn’t care at all. But I think our mission, the way our mission is going, the time is going to be less and less, and that if they don’t make it a priority it’s going to fail.” (P2)

“But like I said, if you don’t get those leaders to believe in it (P3)...it’s not gonna work.” (P8.)

The purpose of the P3 being implemented was to improve soldier performance. This performance is multi-faceted and includes physical, emotional, and cognitive skills. Additionally, the P3 identifies soldiers as tactical athletes, described by interviewees as individuals who exemplify optimal performance. Participant 2 described a tactical athlete as follows:

“We all are tactical athletes, right. They don’t want an individual that runs a marathon, they don’t want uh, a power lifter, they want someone that’s somewhere in the middle. I want to be able to take that 180- to 200-pound individual and be able to carry them, or push them, pull them for a long period of time. But that means you need to be in your...uh, physical state to be able to do that. So, the...the flexibility, the strength, and the endurance. All in one, together.” (P2.)

Tactical athletes can perform physically and mentally to the best of their ability across environments. Sleep is the essential pillar for enabling soldiers to build a foundation for recovery and improve daily function

and performance. Participants identified the importance of mental agility for soldiers as they experience changes in their environments. Again, sleep is crucial for that mental performance. For participants, sleep leads to the Army's ability to have more mission successes than failures.

Finally, participants compared tactical athletes (soldiers) at the wire (warzone) to a sports player playing in the championship game. The crucial difference is that tactical athletes cannot fail at their mission compared to traditional sports athletes. These no-fail missions add to the risks soldiers face and further emphasize the importance of sufficient sleep.

"You know, it's not just the championship. It's like every time we go out to the wire, that's our championship game. Every single time. And you cannot fail. It...it's, like you have to have that mentality that it's not even an option. Because if we fail, we don't just go, oh darn it we got second place, we go, 'This person died. This person died. We failed the mission.'" (P9.)

Recognition of the Army's Sleep Culture

The third theme that emerged from participants was the overarching influence of the Army's culture regarding sleep on the obtainment of restful sleep, the importance of sleep, and the ability to change sleep. This theme also included the overarching sense that despite participants being highly motivated to change sleep for themselves and their subordinates positively, there was disbelief in being able to do so.

Many participants acknowledged that the recognition of sleep being important for AD soldiers has improved over the years. However, participants described a large disconnect between a longstanding traditional culture of accepting limited sleep as part of the norm and striving to improve sleep. The consensus was that the military trains soldiers to operate without sleep, and therefore, the culture is to learn to accept decreased quality and quantity of sleep.

"I think that the Army has...trained us to operate without it. It's the nature of the beast. We need to be able to optimally perform without sleep." (P8.)

Additionally, participants repeatedly reported their sleep has diminished as they have been promoted through the ranks. Increases in responsibility, both at work and at home, have caused a decrease in sleep. This was explained by participant 1.

"I mean lower the rank you are the more sleep I think you can get. Um, as I progressed in the ranks, became more involved I had a lot more responsibilities. Then my sleep started to become um, be uh...went away." (P1.)

Because restful sleep is often limited, participants identified that soldiers must resort to various coping skills to be able to perform mission requirements, roles, and responsibilities. Coping skills identified by participants for combating the effects of decreased sleep include both adaptive and maladaptive means. Caffeine consumption (coffee and energy drinks) was repeatedly identified as increasing when sleep was minimal.

"Usually I'm good with one cup. I do depend on caffeine in the morning otherwise I get the caffeine headache, but when I don't get enough sleep, I'm very dependent on that cup of coffee, like not only do I get a cup of coffee in the morning before I head into work....But then you know might be mid-morning and someone's like, 'Oh, we're gonna go make a run. Do you want something?' And I'm like, 'Yes, please.' And then you know, we're released for lunch and I end up, I'm getting coffee again." (P5.)

Many participants voiced that the challenge is not having soldiers understand sleep hygiene principles but finding ways for implementation in an ever-changing routine with varying leadership support and mission demands.

A multitude of reasons were identified for sleep obtainment being important for AD soldiers, including optimal performance across physical, emotional, and cognitive areas. The consensus was that most would benefit from improving sleep, both in quality and quantity, with quality being the most important.

"I mean, sure, right? Everybody wants their sleep. Um, we push it, but it's also up to the individual to, to get it." (P3.)

"Generally speaking, it's, it's put on the individual to make sure that they're meeting those things (sleep)." (P4.)

Sleep is an important asset that needs leadership focus. Leadership was repeatedly identified as being able to influence soldiers' sleep. Leaders are responsible for being role models for sleep obtainment and emphasizing its importance. Leaders must provide consistent messaging and ample time within mission requirements for soldiers to sleep.

"Empowering the leaders, letting them know that hey, when you're in charge be in charge. If you can allow your soldiers, your civilians, your officers, so your soldiers in general, uh, or civilians, if you can allow that time. If it is afforded, ensure that they are taking that down time. Ensure they are not running themselves into the ground. There's pride and then there's...I can't get work out of someone who's dead, I can't get work out of someone who's proverbially dead. Um, so that. Just empower the leaders." (P2.)

"Think really there is a lot of individual ones (leaders) that put on the soldiers about making sure you take care of you and take care of that. But our soldiers, will neglect themselves, um, rapidly if it means just making their superiors happy." (P4.)

As most interviewees were leaders, they expressed concern about not knowing how to impact their own sleep and their subordinates' sleep. The concern is not learning more about sleep components but figuring out how to implement changes.

"I don't really know how to help someone else get more sleep other than go talk to your doctor, and possibly get put on medicine." (P6.)

"Then field and stuff I just don't see a way to implement more sleep." (P11.)

This sense of decreased self-efficacy resounded as an overarching challenge for the soldiers to impact their own sleep and the culture of sleep in the Army. Many voiced this by stating they didn't know if it could truly be changed, despite any amount of belief that it should change.

The essence of sleep among AD soldiers is complex. Sleep is recognized as multi-faceted, individualized, and challenging to obtain for civilian and military populations. The many barriers faced in civilian culture are equally present in military culture while also adding stressors of mission success and fluctuating environments. Participants believed that tactical athletes must value and implement sleep into their daily routine to perform soldier tasks and duties optimally. While this culture shift has steadily been improving since the implementation of the P3 and sleep hygiene principles, participants have limited belief in the ability to improve sleep for the AD population much further. Participants appeared highly motivated to improve sleep for themselves and their subordinates. At the same time, an overarching sense of helplessness in ability or knowledge of how to make a change ultimately limits progression.

DISCUSSION

This research aimed to understand the attitudes, beliefs, and sleep quality among the AD Army community and its relation to occupational performance to influence the effective development of future occupational therapy intervention programs. PSQI scores help to delineate poor and good sleepers based on participant perception of sleep quality. These scores were significant for caffeine use, as participants in the poor sleep group also identified higher amounts of caffeine consumption. Additionally, only those in the poor sleep group reported consuming five or more cups of caffeine per day. These results are like those identified in a 2012 report from the Centers for Disease Control (CDC): postdeployed service members who

identified drinking three or more caffeine drinks per day were likelier to report poor sleep.²³ Qualitatively, this study echoed the quantitative results with most participants who completed interviews reporting a coping mechanism for decreased sleep: increasing their caffeine consumption.

DBAS-16 scores identify individuals with dysfunctional beliefs and attitudes about sleep, with higher scores indicating more dysfunctional beliefs. While there is no official cutoff score, this study utilized 4, based on previous studies finding 3.8 and 3.5 to be significant.^{24,25} These findings were consistent in this study using the cutoff score of 4; scores on the DBAS-16 were significant with school, APFT score, alcohol use, and alcohol amount.

There were multiple significant findings between the outcome measures used in this study. The findings revealed that those with poor sleep quality on the PSQI had dysfunctional beliefs, as indicated by their scores on the DBAS-16. Furthermore, those with poor sleep also reported decreased perceived daily function compared to those with good sleep. Only individuals with dysfunctional beliefs scored in the highest poor sleep quality severity group (scores 16-21). These findings indicate a relationship between poor sleep quality, dysfunctional beliefs about sleep, and decreased perceived daily function. Qualitatively, this study revealed that participants verbalized numerous adverse outcomes on performance domains (physical, psychological, and emotional) with reduced sleep, consistent with quantitative findings. Lastly, participants with dysfunctional beliefs comprised the largest number of individuals who scored in the lowest group for daily function, while no dysfunctional beliefs scored in the highest perceived daily function group. This leads to perceived daily function being impacted by dysfunctional beliefs and attitudes about sleep.

The many barriers identified by participants that are specific to the Army environment (eg, deployment stressors, family separation, poor sleep environment, training schedules, and elevated stress levels) were consistent with findings from multiple articles.⁹⁻¹¹ Additionally, participants identified that many missions add extra stress to a soldier's job as they cannot fail, as failure indicates lives and personnel lost. This concern for safety and acknowledgment of decreased safety with poor sleep is consistent with previous studies that have identified safety violations because of poor sleep.^{13,18}

Participants acknowledged increased awareness of the need for sleep for soldiers to perform their duties since the establishment of the P3 initiative; however, they report struggling with inconsistent messaging across units, leadership, and training. Additionally, participants identified that sleep hygiene education is insufficient as a standalone method to improve sleep for soldiers. Participants also identified that leadership could affect change for sleep in the AD community. A more proactive effort by the Army and its leadership

must improve sleep behaviors and practices among service members, thus improving sleep quality and quantity. This has similarly been reported in other peer-reviewed articles.^{26,27}

Finally, an overarching sense of decreased control over sleep for self and others was expressed by participants. This sense of helplessness or decreased self-efficacy impacted participants' belief that sleep could be changed within the AD population. Self-efficacy, including sleep quality and quantity, has been evaluated in previous studies. One study found that improving individuals' self-efficacy, vitality, proactive behavior, and daily performance for work may increase.²⁸ Exploring self-efficacy among AD soldiers and its relation to sleep quality and quantity and the ability to change sleep obtainment and daily function is warranted.

Strength of the Study

This study is the first to explore the attitudes and beliefs of AD soldiers on sleep, concerning sleep quality and occupational performance. This study is the first that the authors are aware of to identify self-efficacy as a barrier to increasing restful sleep for the AD soldier population, which can lead to future hypothesis-driven research and implications for occupational therapy practice.

Study Limitations

The use of self-reported measures provides a combination of true outcomes and response and recall bias secondary to the subjective nature. However, valid and reliable outcome measures were used to overcome this limitation, and participants were instructed to provide normative sleep patterns for responses. Member checking could not be completed secondary to participants' limited time on station. This was expected since we used a single cohort cross-sectional study design. Furthermore, the authors completed reflective journals and triangulation during the coding process and kept an audit trail to assist in increasing rigor for the qualitative results. Despite the limitations of this study, it establishes a beginning for augmenting positive change to understand the relationship between current attitudes, beliefs, and sleep quality of AD soldiers and perceived impact on occupational performance.

Implications for Practice

Examining the sleep experiences within the AD Army community unveiled barriers to improving restful sleep for this population that have not previously been reported. Decreased self-efficacy is one such area. This identification can now encourage Army occupational therapists to explore initiatives to improve the self-efficacy of soldiers to enable them to be able to implement sleep hygiene principles in their own and their subordinates' lives.

Future Research

First, exploring the attitudes, beliefs, and sleep quality of focused sub-populations within the AD community may be important as results could differ secondary to unique

environmental demands. Second, surveying Army leaders for attitudes and beliefs about sleep for themselves and the level of importance of sleep for their subordinates could uncover additional obstacles or opportunities. Finally, focusing research on discovering the impact of self-efficacy on the sleep quality of a service member and their implementation of sleep hygiene education in their daily routine could benefit individuals, units, and missions. Continued use of mixed method studies on sleep within the AD population would be valuable.

CONCLUSION

This study was the first to examine the attitudes, beliefs, and sleep quality of AD soldiers and its impact on occupational performance while additionally exploring the relationship between these variables. The lived sleep experiences among AD soldiers were also discovered. The findings from this study benefit the occupational therapy profession's ability to continually improve upon intervention initiatives to enhance the quality of sleep among soldiers. This improvement will increase the potential to achieve higher readiness levels and decrease safety hazards for all soldiers of the US Army.

References

1. Adan A, Fabbri M, Natale V, et al. Sleep Beliefs Scale (SBS) and circadian typology. *J Sleep Research*. 2006;15(2):125-132. doi:10.1111/j.1365-2869.2006.00509.x
2. Ohayon M. Epidemiological overview of sleep disorders in the general population. *Sleep Med Reviews*. 2011;2:1-9 doi:10.17241/smr.2011.2.1.1
3. Ohayon, M. Epidemiology of insomnia: what we know and what we still need to learn. *Sleep Med Reviews*. 2002;6(2):97-111. doi:10.1053/smr.2002.0186
4. Soldatos C, Allaert F, Ohta T, et al. How do individuals sleep around the world? Results from a single-day survey in ten countries. *Sleep Med*. 2005;6(1):5-13. doi:10.1016/j.sleep.2004.10.006
5. Taylor D, Pruiksma K, Hale W, et al. Prevalence, correlates, and predictors of insomnia in the US army prior to deployment. *Sleep*. 2016;39(10):1795-1806. doi:10.5665/sleep.6156
6. Capaldi V, Guerrero M, Killgore W. Sleep disruptions among returning combat veterans from Iraq and Afghanistan. *Mil Med*. 2011;176(8):879-888. doi:10.7205/milmed-d-10-00440
7. Jenkins MM, Colvonen PJ, Norman SB, Afari N, Allard CB, Drummond SP. Prevalence and mental health correlates of insomnia in first-encounter veterans with and without military sexual trauma. *Sleep*. 2015;38(10):1547-1554. doi.org/10.5665/sleep.5
8. Lentino C, Purvis D, Murphy K, et al. Sleep as a component of the performance triad: the importance of sleep in a military population. *US Army Med Dep J*. 2013;9(4):98-108.
9. Crowley S, Wilkinson L, Burroughs E, et al. Sleep during basic combat training: A qualitative study. *Mil Med*. 2012;177(7):823-828. doi:10.7205/milmed-d-12-00022
10. Miller N, Shattuck L, Matsangas P. Sleep and fatigue issues in continuous operations: a survey of U.S. army officers. *Behav Sleep Med*. 2011;9(1):53-65. doi:10.1080/15402002.2011.533994

11. Wesensten, N, Balkin, T. The challenge of sleep management in military operations. *US Army Med Dep J*. 2013;9(4):109-118.
12. Williams S, Collen J, Wickwire E, et al. The impact of sleep on Soldier performance. *Curr Psychiatry Rep*. 2014;16(8):459. doi:10.1007/s11920-014-0459-7
13. Rae D, Chin T, Dikgomo K, et al. One night of partial sleep deprivation impairs recovery from a single exercise training session. *Eur J Appl Physiol*. 2017;117(4):699-712. doi:10.1007/s00421-017-3565-5
14. US Dept of the Army. *Holistic Health and Fitness Testing*. DA;October 2020. Army Techniques Publication 7-22.01. Accessed January 8, 2024. https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1020966
15. Peterson A, Goodie J, Satterfield W, Brim W. Sleep disturbance during military deployment. *Mil Med*. 2008;173(3):230-235.
16. Plach H, Sells C. Occupational performance needs of young veterans. *Am J Occ Ther*. 2012;67(1):73-81. doi:10.5014/ajot.2013.003871
17. Smith N, Hill R, Marshall J, et al. Sleep related beliefs and their association with alcohol relapse following residential alcohol detoxification treatment. *Behav Cogn Psychother*. 2013;42(5):593-604. doi:10.1017/s1352465813000465
18. Caldwell JL, Gilreath SR. Work and sleep hours of US Army aviation personnel working reverse cycle. *Mil Med*. 2001;166(2):159-66.
19. Buysse D, Reynolds C, Monk T, et al. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research*. 1989;28(2):193-213.
20. Morin C, Vallières A, Ivers H. Dysfunctional beliefs and attitudes about sleep (DBAS): validation of a Brief Version (DBAS-16). *Sleep*. 2007;30(11):1547-1554. doi:10.1093/sleep/30.11.1547
21. Chasens E, Ratcliffe S, Weaver T. Development of the FOSQ-10: a short version of the functional outcomes of sleep questionnaire. *Sleep*. 2009;32(7):915-919. doi:10.1093/sleep/32.7.915
22. Sanders C. Application of Collaizzi's method: interpretation of an audible decision trail by a novice researcher. *Contemporary Nurse*. 2003;14(3):292-302.
23. Centers for Disease Control and Prevention. Energy drink consumption and its association with sleep problems among U.S. service members on a combat deployment - Afghanistan, 2010. *MMWR Morb Mortal Wkly Rep*. 2012;61(44):895-898.
24. Carney C, Edinger J, Morin C, et al. Examining maladaptive beliefs about sleep across insomnia patient groups. *J Psychosom Res*. 2010;68(1):57-65. doi:10.1016/j.jpsychores.2009.08.007
25. Smith S, Trinder J. Detecting insomnia: Comparison of four self-report measures of sleep in a young adult population. *Journal of Sleep Res*. 2001;10:229-235. doi:10.1046/j.1365-2869.2001.00262.x
26. Adler A, Saboe K, Anderson J, et al. Behavioral health leadership: new directions in occupational mental health. *Curr Psychiatry Rep*. 2014;16(10):1-7.
27. Mysliwiec, V, Walter, R, Collen, J, et al. Military sleep management: An operational imperative. *US Army Med Dep J*. 2016;12(2):128-124.
28. Schmitt, A, Belschak, F, Den Hartog, D. Feeling vital after a good night's sleep: The interplay of energetic resources and self-efficacy for daily proactivity. *J of Occup Health Psychol*, 2017;22(4):443-454. doi:10.1037/ocp0000041.

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Characterization of Wrist Conditions in Active Duty Service Members at a Major Medical Center: A Retrospective Review

MAJ Brandon R. Stanley, DSc; MAJ Chelsea M. Truax, DSc; LTC Brian T. Gregg, PhD; COL Enrique V. Smith-Forbes, PhD

ABSTRACT

Background: Musculoskeletal (MSK) injuries threaten readiness in peacetime and combat operations by impacting rates of lost duty time and personnel attrition. Active duty service members (ADSMs) in the Army, Air Force, Marines, and Navy sustained 562 400 acute injuries of the hand and wrist, which are the third most frequent acute injuries in the Armed Forces. Studies exist characterizing MSK injuries; however, none have characterized upper extremity conditions by body region in the ADSM population. The purpose of this study was to describe the characteristics of wrist conditions in ADSMs.

Methods: We conducted a retrospective review of outpatient occupational therapy (OT) records of ADSMs aged 18 to 62 at a major military medical center for any wrist condition. Study variables of demographics, wrist conditions, treatment duration, and clinical outcomes were extracted from the Armed Forces Health Longitudinal Technology Application (AHLTA) and analyzed.

Results: There were ($n = 110$) subject records. Tendinous wrist conditions (34%) were the most prevalent, followed by ligamentous (24%), bone (15%), nerve (11%), and cyst (8%). The overall average length of OT treatment was 7.81 ± 5.53 weeks. The mean initial *QuickDASH* score was 34.22 ± 19.79 , the mean D/C score was 26.29 ± 19.42 , and the mean change score was 7.93 ± 14.90 . There was no statistically significant difference for the average treatment length or *QuickDASH* change scores based on primary injury type. Average *QuickDASH* initial and discharge scores by primary injury type were statistically significant.

Conclusions: This study described the most frequent wrist conditions by injury type, diagnosis, and OT treatment. The results support the continued need for prevention efforts for the wrist conditions identified. Also, the study highlights the importance of consistent documentation and standard assessment completion for an accurate depiction of the effectiveness of OT treatment.

INTRODUCTION

Musculoskeletal (MSK) injuries are prevalent in military service members (SMs) due to demanding job requirements and pose a high risk of lost duty time in both peacetime and combat operations. The average limited duty days due to musculoskeletal injury was 7.5 per injury for female SMs and 13 per injury for males during a 12-month deployment to Afghanistan from 2009 to 2010. Approximately 75% of musculoskeletal injuries sustained by ADSM are gradual and result from cumulative microtrauma, with damage caused by repetitive physical forces during physical training activities.¹ Sports and physical training incidents contribute to MSK injuries, which negatively affect force readiness.² In addition

to personnel attrition and lost duty time, MSK injuries may eventually lead to medical discharge from the Armed Forces.³

Distal upper extremity injuries involving the hand and the wrist are common diagnoses in medical care. In a 2009 study characterizing wrist conditions in the civilian population, wrist injuries accounted for 15.3% of all upper extremity injuries in the emergency department.⁴ In the military, active duty service members (ADSMs) in the Army, Air Force, Marines, and Navy sustained 562 400 acute injuries of the hand and wrist, which ranked third highest among all acute MSK injuries in the Armed Forces from 2008 to 2017.⁵ During deployments in Afghanistan and Iraq, wrist and hand fractures

ranked second for fractures, following the lower leg and ankle, and third for dislocations, following the shoulder and the knee.⁶

Army occupational therapists (OTs) are responsible for evaluating and treating MSK injuries involving the upper extremities, especially the wrist, and have been deemed subject matter experts in the military.⁷ Army OTs serve as direct access neuromusculoskeletal evaluators of the upper extremity.⁸ In this unique role, Army OTs provide far-forward care at first contact after the point of MSK injury. Army OTs possess the clinical skills to holistically evaluate SMs with upper extremity injuries and provide client-centered care through functional rehabilitative interventions for recovery. Army OTs diagnose ADSMs with upper extremity MSK conditions, including the wrist, to facilitate their prompt return to duty, supporting force readiness. Army OTs are responsible for evaluating various upper extremity conditions and injuries, beginning early conservative treatment, and triaging traumatic injuries to higher echelons of care.⁸ Describing characteristics and OT treatment of the wrist in ADSMs diagnosed with an MSK condition may contribute to Army OT's ability to provide best practices in support of the warfighter.

Standardized assessment tools or outcome measures are used to evaluate wrist injuries. These tools assure greater accuracy and consistency in distinguishing and documenting physical and functional deficits.⁹ The primary outcome measure investigated for this study was *QuickDASH*.¹⁰ Although limited literature exists for the *QuickDASH* and wrist conditions, the instrument's psychometric properties are comparable to the full DASH as an effective outcome measure for use with upper extremity conditions.¹⁰ The DASH has been investigated for use with upper extremity conditions in the military population, most recently for elbow conditions, including radial head arthroplasty and medial ulnar collateral ligament reconstruction.^{11,12}

Several studies characterize MSK injuries of the upper extremities from a global perspective; however, no study has specifically investigated the characteristics of wrist conditions by region or OT outcomes used in the ADSM population. Therefore, this study was conducted to fill this gap in the literature. The purpose of this study was to describe the characteristics of wrist conditions in ADSMs. Specifically, this study sought to determine the most frequent wrist conditions in ADSMs, the average OT treatment period, and the average initial, discharge, and change scores on the *QuickDASH* for wrist conditions.

METHODS

This study was approved by the Regional Health Command-Central Institutional Review Board, protocol reference number C.2018.144d/eIRB 906485. Medical records were accessed from the Armed Forces Health Longitudinal Technology Application (AHLTA) electronic medical records system. Records of ADSMs who received outpatient OT for wrist MSK injuries or conditions at Brooke Army Medical Center between January 2016 to 2019 were manually reviewed for inclusion. Subjects included ADSMs aged 18 to 62. ADSMs who only participated in an initial evaluation were excluded from the study.

Procedure

A data query was fulfilled from the Military Health System Mare (M2) database, and variables were extracted from AHLTA based on wrist diagnosis ICD-10 codes. The primary investigator obtained the list of ADSM records, and chart reviews were completed to determine the eligibility of the records based on the inclusion criteria for the study dataset. Personally identifiable information of eligible records was typed on a master list, and subject number for de-identification was assigned before entry into a separate dataset for statistical analysis. The statistical analysis dataset was maintained on a password-protected Excel sheet and a government password-protected computer in a locked office with access only by the primary investigator (PI) and the associate investigator (AI). The master list, which included patient identifiers and data collection sheets, was kept in a locked cabinet within a separate secure office. The master list was destroyed once all data variables were collected.

Chart reviews were completed by the PI and AI, searching for aspects of wrist conditions, including demographic information, diagnosis, outcome measures, objective findings, and rehabilitation treatment plans. Data were extracted through AHLTA access by the PI and AI. Obtained variables with corresponding subject numbers recorded were entered into the data collection sheet. The demographic information included age, gender, Military Occupational Specialty (MOS), and rank. Medical information for wrist conditions included diagnosis, hand dominance, surgical procedures, comorbidities, mechanism of injury (MOI), injury type, multiple injury types, and time since injury.

Recorded results from outcome measures were obtained comprising the *QuickDASH*, the Patient Specific Functional Scale (PSFS), range of motion (ROM), grip strength, and the Numerical Pain Rating Scale (NPRS). *QuickDASH* is a self-report outcome measure consisting

of eleven items comprising seven functional items and three symptom-based items. Patients complete the questionnaire to report symptoms and performance ability for daily tasks that may be affected by an upper extremity MSK injury. Each item is ranked on a 5-point Likert scale in which at least ten of the eleven items must be completed to analyze the responses. The total score range is 0 to 100. A lower score represents an increased ability, whereas a higher score represents increased disability. The *QuickDASH* demonstrates good reliability, validity, and responsiveness when utilized for patients with a proximal or distal condition of the upper extremity. Test-retest reliability for the *QuickDASH* is excellent, with an intraclass correlation coefficient (ICC) of 0.94 and alpha reliability of .90.^{10,13} Franchignoni et al¹⁴ found that the Minimal Clinical Important Difference (MCID) for the *QuickDASH* is 15.91 points.

The PSFS is a self-reported, patient specific measure designed to assess functional change in patients presenting with MSK disorders. Construct validity is supported for the PSFS, and reliability is reported as moderate to good (ICC[2,1] = 0.713).¹⁵ The MCID for the PSFS is a 1.2-point increase of the average score.¹⁵

Patients use the NPRS to report subjective pain intensity for musculoskeletal conditions verbally. Pain rating scores range from 0 to 10, with 0 being no pain and 10 being a patient's worst pain. The NPRS has high test-retest reliability ($r = 0.96$), good construct validity, and an MCID of 2 points.¹⁶⁻¹⁸

ROM measurements utilizing goniometry measure the available motion of the joint(s) affected by MSK injuries and conditions. Intra-rater reliability for measuring both active and passive wrist motion has been established as excellent for all wrist motions when performed by the same therapist under the same clinical conditions.¹⁹ Normal functional wrist ROM equates to 40 degrees of wrist extension and flexion and 20 degrees of radial and ulnar deviation, respectively, to achieve 40 degrees of lateral motion.²⁰ These norms were established by Ryu et al²⁰ to determine whether subjects' wrist conditions resulted in functional ROM deficits.

Grip strength assessment utilizing a Jamar dynamometer measures isometric hand and forearm strength in kilograms or pounds to evaluate hand strength and function changes. These changes may be influenced by weakness or pain from MSK injuries or conditions. Grip strength has been found to have excellent test-retest reliability (ICC[2,1] = 0.96) with normative data reported for this measure based on a patient's age.²¹

Data Analysis

The dataset was checked for transcription errors by the PI and AI before analysis. Data in nominal scale was recoded to numbers for analysis. Statistical analysis was performed using JMP®, Version 14 (SAS Institute Inc, 1989-2019). The PI and AI performed descriptive statistics for the sample population and inferential statistics utilizing the Wilcoxon Ranked Sum Method with the Mann-Whitney *U*-test to compare differences between two independent groups or the Kruskal-Wallis test for the comparison of more than two independent groups. Chi-square crosstabulation was used for categorical variable analysis, and correlational analysis was completed with the Spearman Coefficient to analyze the relationship between ranked variables. Significance for results was established when *p*-values were less than 0.05. Records that did not attain the desired variables were left blank in the dataset. The San Antonio Institutional Review Board approved this study.

RESULTS

Inclusion criteria were met with ($n = 110$) records. Demographic data is summarized in Table 1. The wrist conditions reviewed were identified based on ICD-10 codes. These diagnoses were categorized by primary injury types, including tendinous, ligamentous, bone, nerve, and cyst. Tendinous injury involved a tendon or tendons within the wrist, affected by an identifiable MOI. For example, tendons of the extensor pollicis brevis and the abductor pollicis longus are two tendons historically involved with the diagnosis of radial styloid tenosynovitis, which occurs at the first dorsal wrist compartment. Ligamentous injury included a sprain or tear of a ligament(s) within the wrist. The most common wrist ligaments sprained include the scapholunate, luno-triquetral, and triangular fibrocartilage complex. For this study, bone injury comprised carpal bone or distal forearm bone fractures and arthritic conditions. Injuries were classified as nerve-related if a nerve compression was confirmed through physical examination and provocative testing. Lastly, cystic conditions included a movable and palpable mass on the dorsal or volar wrist. Ganglion cysts were the most common cystic injury. They can be determined by medical imaging confirmation, such as an ultrasound or magnetic resonance imaging, or by the presence of the mass during physical examination. The MOI was also considered and included injury from a fall, a functional task or activity, a workout-related injury, a sport-related injury, insidious onset, or combat-related trauma. All wrist characteristics, including diagnosis and surgical procedure, are listed in Table 2.

Table 1. Demographic Data of Study Participants, Ages Ranging from 18-59

Variable	Category	Value			%
		Mean (SD)	Range	Number ^a	
Age		36.01 (10.06)	18-59		
Sex	Male			64	58
	Female			46	42
Rank	Enlisted			75	68
	Officer			35	32
Military Branch	Army			78	71
	Marines			0	0
	Air Force			24	22
	Navy			8	7
MOS	Medical			47	43
	Non-medical			49	44
	Unspecified			14	13

SD: standard deviation; MOS: Military Occupational Specialty

^aThis study comprised 110 subjects

Occupational Therapy Treatment Characteristics

The overall average length of treatment was 7.81 ± 5.53 weeks. The OT treatment provided for wrist conditions is outlined in Table 3. OT treatment plans for the subject records were categorized into home exercise program (HEP) only, in-clinic treatment only, or both HEP and in-clinic treatment concurrently. Subjects who received HEP treatment only represented 41% ($n = 45$) of the dataset, and those who received HEP and in-clinic treatment concurrently made up 40% ($n = 44$), whereas 18% ($n = 20$) of the subjects participated in in-clinic treatment only, with one subject missing a specified treatment plan. ADSMs who received HEP and in-clinic treatment concurrently had a significantly longer length of treatment than those who had in-clinic treatment alone ($p < .001$), and treatment for those who received HEP was significantly longer than in-clinic treatment ($p = .008$).

QuickDASH

Initial and discharge (D/C) QuickDASH scores were recorded to obtain this sample's average, initial, D/C, and change score for wrist conditions (Table 4). There were 13 subjects missing either an initial score, a D/C score, or both. These subjects were not included in the analysis to determine the change scores on the QuickDASH from initial evaluation to D/C. The mean initial score was 34.22 ± 19.79 , the mean D/C score was 26.29 ± 19.42 , and the mean change score was 7.93 ± 14.90 , including those who reported an increase on the QuickDASH. Twenty-two (23%) of the 97 subjects reported an increase on the QuickDASH at D/C. The mean change score was 13.54 ± 14.90 , excluding the subjects who reported an increase. QuickDASH initial, discharge and change scores were analyzed using the Kruskal-Wallis test (Table 5).

Table 2. Wrist Characteristics Data

Variable	Category	n	%
Mechanism of injury	Fall	17	16
	Functional	18	16
	Sports-related	3	3
	Workout-related	8	7
	Insidious onset	63	57
	Combat related	1	1
Post-op treatment	Yes	13	12
	No	97	88
Primary injury type	Bone	17	15
	Ligamentous	26	24
	Tendinous	37	34
	Nerve	12	11
	Cyst	9	8
	Missing	9	8
Hand dominance	Right	95	86
	Left	12	11
	Missing	3	3
	Dominant side affected	72	65
	Non-dominant side affected	35	32
	Missing	3	3
Diagnosis	Arthritis	7	6
	Bone contusion	2	2
	Distal radius fracture	1	1
	Ganglion cyst	9	8
	Ligament injury	18	16
	Ligament tear	6	6
	Median nerve compression	10	9
	Scaphoid fracture	3	3
	Tendonitis	21	19
	Tenosynovitis	18	16
	Triquetral fracture	2	2
	Triquetrum fracture	1	1
	Ulnar nerve compression	2	2
	Missing	10	9
Post-operative procedures	AIN/PIN neurectomy	2	16
	Arthroscopic debridement	2	15
	De Quervain's release	1	8
	Ganglion cyst excision	3	23
	Scaphoid distal pole excision	1	8
	Scaphoid ORIF	2	15
	Trapeziectomy	1	8
	Ulnar shortening osteotomy	1	8

n: number; AIN: anterior interosseous nerve; PIN: posterior interosseous nerve; ORIF: open reduction and internal fixation

Table 3. Treatment Characteristics

Variable	Category	Value			
		Mean (SD)	Range	n	%
OT treatment length	Months	7.81 (5.53)	1-30		
From injury to OT evaluation	0-3			45	41
	4-6			17	15
	7-9			3	3
	10-12			7	6
	12+			38	35
Treatment plan	HEP			45	41
	In-clinic treatment			20	18
	HEP & in-clinic treatment			44	40
	Missing			1	1
Referral to another discipline	Yes			26	24
	No			23	76
	If yes:				
	Othopedics			23	88
	Physical therapy			2	8
Wrist orthosis	Neurology			1	4
Wrist orthosis	Yes			71	65
	No			39	35

OT: occupational therapy; HEP: home exercise plan.

Table 4. QuickDASH Average Scores

QuickDASH	n	Mean (SD)	Range
Initial score	97	34.22 (19.79)	0-88.63
Discharge score	97	26.29 (19.42)	0-81.81
Change score	97	7.93 (14.90)	31.82-48.0
Change score ^a	75	13.54 (14.90)	0-48.0
Missing	13		
Effect size		0.40	

^aExcluding subjects who reported an increase in QuickDASH score

Table 5. Group Comparisons Between QuickDASH Scores and Primary Injury Type Using the Kruskal-Wallis Test

Primary injury type x	Injury type	Ligamentous	Bone	Nerve	Cyst
Initial score	Tendon	0.005**	0.352	0.247	0.004**
	Ligamentous		0.148	0.431	0.137
	Bone			0.616	0.041*
	Nerve				0.152
Discharge score	Tendon	0.048	0.868	0.692	0.005**
	Ligamentous		0.110	0.037*	0.038*
	Bone			0.747	0.004**
	Nerve				0.001**
Change score	Tendon	0.334	0.419	0.080	0.570
	Ligamentous		0.939	0.162	0.761
	Bone			0.488	0.801
	Nerve				0.250

x: multiply by; Kruskal-Wallis Test: * = $p < 0.05$; ** = $p < 0.01$

QuickDASH scores were analyzed independently by categorical variables. There were statistically significant findings with primary injury types and QuickDASH scores (See Table 5). The MOS categories had a statistically significant difference for the initial ($p = .002$) and D/C ($p < .001$) scores on the QuickDASH. Subjects with a non-medical MOS reported higher initial and D/C QuickDASH scores than medical. Subjects with multiple injury types compared to subjects with only one primary injury type had a significantly higher initial ($p = .002$) and discharge ($p = .006$) QuickDASH score. There was no statistically significant difference in QuickDASH initial or D/C scores for military rank, branch of service, gender, hand dominance, dominant side injured, post-operative, previous wrist injury, and comorbidities. QuickDASH change scores were analyzed and had no statistical significance with any categorical variables.

Patient Specific Functional Scale

The PSFS was omitted from data analysis due to the lack of reported scores within the data set records. For example, five subjects (4.5%) in the dataset had the PSFS completed, while the remaining 105 subjects (95.5%) did not.

Of the five scores obtained from the subjects with the PSFS recorded, all surpassed the MCID of 1.2 points at an average score of 4.2 at D/C evaluation.

Secondary Findings

An additional Mann-Whitney *U*-test was run to analyze QuickDASH MCID by grip strength to determine whether there was a difference in grip strength between those who met and did not meet the MCID on the QuickDASH. Grip strength results encompassed initial and discharge measures for the right and left side, respectively. There was no statistically significant difference in grip strength based on QuickDASH MCID status on the right initial ($p = .243$) and D/C ($p = .685$) measures or left initial ($p = .130$) and D/C ($p = 0.885$) measures.

A Spearman's correlation was run to assess the relationship between length of treatment and initial scores on the QuickDASH. A positive but weak correlation between the length of treatment and QuickDASH initial scores was statistically significant, $r^2 = 0.194$, $p = .047$. As the initial QuickDASH score increased, the length of treatment also increased.

A Chi-Square Test was run using crosstabulation to summarize the relationship between categorical variables. MCID status was coded as met or not met for the *QuickDASH* and pain assessment using the NPRS. There was a statistically significant association between subjects' MCID status for the *QuickDASH* and MCID status for pain at rest $\chi^2(1) = 5.769, p = .016$. ADSMs who did not meet the MCID on the *QuickDASH* did not meet the MCID for pain at rest. There was no association between *QuickDASH* MCID status and MCID status for pain with use $\chi^2(1) = 3.102, p = .078$. Although no statistically significant association was found, a trend was noted that if the MCID on the *QuickDASH* was not met, the MCID for pain during use was also not met. *QuickDASH* MCID status was also analyzed by wrist ROM status. ROM status was coded as within normal limits (WNL) or deficit based on measurements retrieved from subject records at initial evaluation and discharge. There was no association between *QuickDASH* MCID status and wrist flexion status at initial evaluation $\chi^2(1) = 0.003, p = .959$, wrist flexion status at discharge $\chi^2(1) = 0.744, p = .388$, wrist extension at initial evaluation $\chi^2(1) = 0.692, p = .405$, and wrist extension at discharge $\chi^2(1) = 0.364, p = .546$. ADSMs achieved WNL for wrist AROM at discharge despite whether they met the MCID on the *QuickDASH*. Lastly, *QuickDASH* MCID status was analyzed by D/C disposition. D/C disposition was coded as goals met and goals not met for this analysis. There was a strong association between *QuickDASH* MCID status and D/C disposition $\chi^2(1) = 10.432, p = .001$. If ADSMs did not meet the MCID for the *QuickDASH*, then they also did not meet all their established OT goals.

DISCUSSION

This study aimed to describe the characteristics of wrist conditions in ADSMs who received outpatient occupational therapy at a major medical center at Joint Base San Antonio. Specifically, the study described the most frequent wrist conditions by injury type, diagnosis, OT treatment length, and the *QuickDASH* for these conditions. Tendinosis injury types (34%), resulting in tendon diagnoses, were the most frequent for wrist conditions in this study. It is common for tendon injuries and conditions to be an effect of cumulative trauma from overuse and activities that are repetitive. Hauret et al²² found that over 80% of MSK issues result from overuse, supporting this study's findings. A scoping review evaluating hand and wrist conditions and the baseline scores on the DASH for correspondence to severity reported that 67% of the articles reviewed included chronic inflammatory and degenerative conditions versus posttraumatic disorders.²³ These studies support our findings with the prevalence of chronic overuse disorders.

Additionally, this study supports an insidious onset as the most common MOI. Often, when SMs are evaluated for a

tendinosis issue, they are unable to recall a specific MOI or trauma that before the onset of symptoms, which is known as an insidious onset. SMs are known to under-report MSK injuries that may start as early as initial entry training (IET).²⁴ Sixty-four percent of IET soldiers had an unreported MSK injury while completing initial training.²⁴ Molinar et al²⁵ found that SMs provide various reasons for not reporting MSK injuries, including a threat to career progression, and those injuries may advance into chronic conditions later in an SM's career if not appropriately cared for medically. SMs later seek medical care and may not be able to recall the initial injury that led to their current condition onset.

Ligament injury was this study's second most frequent condition of the wrist. This result is similar to the findings of another military research paper. Belmont et al²⁶ found that ligament injuries were the second most frequent MSK injury reported in SMs in a Brigade Combat Team during a 15-month deployment to Iraq.

Wrist ganglion cyst diagnoses represented the least of all primary injury types in this study. This may be due to the smaller sample size of this study compared to other wrist ganglion cyst studies. Review of a larger number of records may have yielded more cystic diagnoses. Although this condition was the least frequent, ganglion cyst excisions were the most common surgical procedure. These procedures are important to note as ganglion cysts are common in the military due to repetitive weight bearing when performing push-up exercises, and open surgical excision yields fewer ganglion recurrences.²⁷

The average OT treatment length was approximately 8 weeks. Generally, this equates to an initial and two follow-up evaluations with the occupational therapists for those following a HEP. In addition to therapist evaluations utilized for HEP treatment plans, in-clinic treatment plans provide 8 to 12 treatment sessions between evaluations. There were statistically significant findings with the length of OT treatment based on the treatment plan prescribed. The shortest treatment duration occurred among those who received only in-clinic treatment. Subjects who participated only in a HEP had the next longest treatment duration. Finally, subjects who received both HEP and in-clinic treatment for a wrist condition had the longest treatment time by weeks. This is intuitive in that conservative treatment may have started with a HEP and progressed to in-clinic treatment if symptoms did not change, thus explaining the extended length of treatment.

Multiple secondary analyses were completed for the *QuickDASH* by demographic, diagnosis, and treatment variables. For analysis of the initial and D/C scores on the *QuickDASH* by the MOS categories, non-medical participants showed significantly different scores, higher than

medical participants. Underreporting of MSK injuries in US Army Medical Command (MEDCOM) soldiers versus US Army Forces Command (FORSCOM) has been investigated. One study identified that MEDCOM soldiers did not let the inconvenience of seeking care deter them from reporting an MSK injury and did not exaggerate their injury or condition in contrast to FORSCOM soldiers.²⁵ These findings support why medical and non-medical military personnel may differ in reported *QuickDASH* scores.

When analyzed by any of the variables, the *QuickDASH* change scores had no significant findings. Minimal progress was noted on the *QuickDASH* based on the change score. Multiple contributing factors can apply to these findings. Over 50% of the ADSMs in this study reported a time frame from initial injury to initial OT evaluation that is considered chronic. This time lag may be a main factor for the lack of progress noted on overall *QuickDASH* scores and OT treatment.

Another explanation of the limited progress may be the inconsistent administration of *QuickDASH*. Often, military patients will subjectively report progress by indicating no present deficits in function. Therapists may omit completion of the *QuickDASH* questionnaire based on these reports without documenting a true depiction of progress made on the outcome measure. Additionally, patients who have progressed with a treatment plan frequently do not feel the need to report for a follow-up evaluation if they think they have returned to normal function. Initial completion of the *QuickDASH* questionnaire may be confusing for the first-time patient trying to understand the question items, which may result in incorrect completion of the form. According to Grice,²⁸ occupational therapists reported non-use of outcome measures due to client difficulty and confusion due to cognition and language issues. A strategy used within hand therapy clinics is to provide the questionnaire upon check-in, before interaction or instruction from the therapist, for time management to maintain productivity.²⁸

There are numerous limitations associated with this study. First, the study design was retrospective, not allowing for control of the data collected and at more risk of missing data within the review. Secondly, the subject records were noted to have inconsistent documentation for the *QuickDASH* and PSFS, resulting in a loss of analysis for the entire dataset. Information for objective and outcome measures was either not updated at each encounter or not consistently documented if a change did not occur. This limited the accuracy of the true average of the *QuickDASH* scores. ADSMs may have improved with OT treatment without the *QuickDASH* being administered or updated to reflect the functional improvement on the outcome measure. Effort was placed

on reviewing the maximum number of records within the allotted data collection period to obtain as many records as possible with complete documentation to mitigate these limitations. Emphasis may have also been placed on administering the *QuickDASH* assessment for ADSMs who were not progressing with treatment versus those who were doing well based on subjective reports. Also, multiple documentation templates were within the time frame for records across therapists, locations, and study time frame, making it difficult for consistent data collection. Lastly, the sample population comprised subjects with an average age higher than the overall military age average (28.5 years),²⁹ limiting generalizability to the military population.

The study also had strengths, including access to a large sample of records, potential hypothesis generation for future prospective studies and investigation of the *QuickDASH*, and OT treatment for wrist conditions in the ADSM population. A larger sample size allows for improved generalizability and power of the study. Although the study was a descriptive design, it can serve as a foundation for future studies investigating wrist conditions in military populations. This is the first known study to characterize specific wrist conditions in the ADSM population while investigating the *QuickDASH* and OT treatment.

Future research efforts should focus on characterizing additional upper extremity (UE) body regions in ADSMs, including the elbow and shoulder, as well as larger samples, prospective studies, and multi-site studies. Also, it would be beneficial to describe UE MSK injuries and conditions within operational and combat arms units of the military to gain an accurate depiction of these injuries' effects on the military and force readiness. Additionally, recovery rates of specific conditions can be investigated, and prevention-based studies can be completed given the high percentage of insidious onset found in this study. Extant literature has identified prevention strategies for MSK injury in the military population. Future prospective studies can determine the effectiveness of implementing these strategies.

CONCLUSION

This study was the first to characterize wrist conditions and OT treatment specifically in the ADSMs population. This study identified the most frequent wrist conditions by injury type and diagnosis. The type of injury and diagnosis plays a major role in planning and prescribing treatment, which determines the expected length of treatment. Lastly, the study highlights the importance of consistent documentation and standard assessment completion for an accurate depiction of the effectiveness of rehabilitative

treatment, as well as the effect that rehabilitative goals may have on progress in treatment. Further research is needed with larger prospective studies of operational forces which include additional UE regions such as the elbow and shoulder.

References

- Jones BH, Hauschild VD, Canham-Chervak Mg. Musculoskeletal training injury prevention in the U.S. Army: Evolution of the science and the public health approach. *J Sci Med in Sport*. 2018;11:1139-1146. doi:10.1016/j.jsams.2018.02.011
- Cameron, KL, Owens, BD. The burden and management of sports-related musculoskeletal injuries and conditions within the US military. *Clin Sports Medicine*. 2014;33(4):573-589. doi:10.1016/j.csm.2014.06.004
- Yancosek KE, Roy T, Erickson M. Rehabilitation programs for musculoskeletal injuries in military personnel. *J Cur Op Rheum*. 2012;24:232-236. doi:10.1097/bor.0b013e3283503406
- Ootes D, Lambers KT, Ring, DC. The epidemiology of upper extremity injuries presenting to the emergency department in the United States. *J Hand*. 2012;7:18-22. doi:10.1007/s11552-011-9383-z
- Stahlman S, Taubman SB. Incidence of acute injuries, active component, U.S. Armed Forces, 2008-2017. *MSMR*. 2018;25:2-9.
- Patel AA, Hauret KG, Taylor BJ, et al. Non-battle injuries among U.S. Army soldiers deployed to Afghanistan and Iraq, 2001-2013. *J Safety Research*. 2017;60:29-34. doi:10.1016/j.jsr.2016.11.004
- Army Regulation 40-68*. Washington, DC, U.S. Department of the Army. Accessed May 2019. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/r40_68.pdf
- Montz R, Gonzales F, Bash DS, et al. Occupational therapy role on the battlefield: An overview of combat and operational stress and upper extremity rehabilitation. *J Hand Ther*. 2008;21:130-136. doi:10.1197/j.jht.2007.12.008
- Weinstock-Zlotnick G, Mehta SP. A structured literature synthesis of wrist outcome measures: An evidence-based approach to determine use among common wrist diagnoses. *J Hand Ther*. 2016;29:98-110. doi:10.1016/j.jht.2016.03.001
- Beaton DE, Wright JG, Katz JN. Development of the QuickDASH: Comparison of three item-reduction approaches. *J Bone Joint Surg*. 2005;87(5):1038-46. doi:10.2106/jbjs.d.02060
- Fuller JB, Dunn JC, Kusnezov NA, et al. Outcome measures after medial ulnar collateral ligament reconstructions in a military population. *J Shoul and Elbow Surg*. 2019;28(2):317-323. doi:10.1016/j.jse.2018.07.025
- Dunn JC, Kusnezov NA, Koehler LR, et al. Radial head arthroplasty in the active duty military service member with minimum 2-year follow-up. *J Hand Surg*. 2017;42(8):1-7. doi:10.1016/j.jhsa.2017.04.005
- Gummeson C, Ward MM, Atroshi I. The shortened disabilities of the arm, shoulder and hand questionnaire (Quick DASH): Validity and reliability based on responses within the full-length DASH. *BMC Musculoskelet Disord*. 2006;7(1):7-44 doi:10.1186/1471-2474-7-44
- Franchignoni F, Vercelli S, Giordano A, et al. Minimal clinically important difference of the disabilities of the arm, shoulder and hand outcome measure (DASH) and its shortened version (QuickDASH). *J Orthop Sports Phys Ther*. 2014;44(1):30-39. doi:10.2519/jospt.2014.4893
- Hefford C, Abbott JH, Arnold R, et al. The patient-specific functional scale: Validity, reliability, and responsiveness in patients with upper extremity musculoskeletal problems. *J Orthop Sports Phys Ther*. 2012;42(2):56-65. doi:10.2519/jospt.2012.3953
- Farrar JT, Young JP, LaMoreaux L, et al. Clinically importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain*. 2001;94(2):149-58. doi:10.1016/s0304-3959(01)00349-9
- Michener LA, Snyder AR, Leggin BG. Responsiveness of the numeric pain rating scale in patients with shoulder pain and the effect of surgical status. *J Sport Rehab*. 2011;20(1):115-128. doi:10.1123/jsr.20.1.115
- Ferraz MB, Quaresma MR, Aquino LR, et al. Reliability of pain scales in the assessment of literate and illiterate patients with rheumatoid arthritis. *Journal of Rheum*. 1990;17(8):1022-1024.
- Horger MM. The reliability of goniometric measurements of active and passive wrist motions. *Am J Occup Ther*. 1990;44(4):342-348. doi:10.5014/ajot.44.4.342
- Ryu J, Cooney WP, Askew LJ, et al. Functional ranges of motion of the wrist joint. *J Hand Surg*. 1991;16(3):409-419. doi:10.1016/0363-5023(91)90006-w
- Savva C, Karagiannis C, Rushton A. Test-retest reliability of grip strength measurement in full elbow extension to evaluate maximum grip strength. *J Hand Surg*. 2013;38(2):183-186. doi:10.1177/1753193412449804
- Hauret K, Jones B, Bullock S, et al. Musculoskeletal injuries. *Am J Preventive Med*. 2010;38(1):S61-S70. doi:10.1016/j.amepre.2009.10.021
- Baltzer H, Novak C, McCabe S. A scoping review of disabilities of the arm, shoulder, and hand scores for hand and wrist conditions. *J Hand Surg*. 2014;39(12):2472-2480. doi:10.1016/j.jhsa.2014.07.050
- Cohen B, Pacheco B, Foulis S, et al. Surveyed reasons for not seeking medical care regarding musculoskeletal injury symptoms in US Army trainees. *Mil Med*. 2019;184(5-6):e431-e439. doi:10.1093/milmed/usy414
- Molinar S, Yancosek K, Smith L. Musculoskeletal injury reporting by U.S. Army medical command (MEDCOM) personnel. *Texas Ortho Journal*. 2015;1(2):71-80. doi:10.18600/toj.010208
- Belmont P, Goodman G, Waterman B, et al. Disease and non-battle injuries sustained by a U.S. Army brigade combat team during operation Iraqi freedom. *Mil Med*. 2010;175(7):469-476. doi:10.7205/MILMED-D-10-00041
- Head L, Gencarelli J, Allen M, et al. Wrist ganglion treatment: systematic review and meta-analysis. *J Hand Surg*. 2015;40(3):546-553. doi:10.1016/j.jhsa.2014.12.014
- Grice, K. The use of occupation-based assessments and intervention in the hand therapy setting-a survey. *J Hand Ther*. 2015;28(3):300-306. doi:10.1016/j.jht.2015.01.005
- Demographics: profile of the military community*. Department of Defense (DoD), Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy. 2017. Accessed February 12, 2024. <https://download.militaryonesource.mil/12038/MOS/Reports/2017-demographics-report.pdf>

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Effective Development and Transition: Leveraging Military Physician Assistants into Civilian Practice

Michael Sharma, MPAS, PA-C; MAJ Brandon M. Carius, DSc, MPAS, PA-C

ABSTRACT

The physician assistant (PA) profession is innately military, with its initial class consisting of military veterans. As it continues to develop, the creation and evolution of the Interservice Physician Assistant Program (IPAP) and experiences of both garrison and austere environments continue to demonstrate the unique progress and status of military-trained PAs. Further, research repeatedly demonstrates the value of military experience in the PA profession. Military PAs demonstrate medical competency and distinct characteristics of leadership, team cooperation, and mentoring, given their experiences while in service. The continued development of post-graduate training for military PAs, including doctoral-level education, provides even greater training to fulfill the challenges of medical care extension further. Here, we offer a brief editorial review of supporting evidence of the military PA strengths, focusing on the transition from military to civilian practice.

INTRODUCTION

When military physician assistants (PAs) consider leaving active duty for civilian careers, they instinctively examine the statistics. They compare advancement opportunities, salaries, locations, and lifestyles and discern what the future may hold on “the inside” while considering a life on “the outside.” Perhaps the most important statistic is this: 100% of soldiers leave the military. At some point, it is inevitable. But like other Specialist Corps professionals, military PAs may only have their military medical experience as a frame of reference when they look to leap into civilian practice. This unfamiliarity can be stressful, especially when hearing of an American civilian medical system that is balancing an access-to-care crisis with higher-than-ever healthcare worker burnout and an ever-increasing focus on financial metrics.¹

MILITARY PHYSICIAN ASSISTANT VALUE TO CIVILIAN PRACTICES

Despite government initiatives to increase the supply of medical providers, many warn of continued staffing shortfalls, even among PAs.^{2,3} From its inception, the PA model of “physician extender” sought to meet the medical needs of increasing numbers of patients. With the maturation of the PA profession over the years and the expansion of PAs into virtually every medical specialty, PAs have

repeatedly proven themselves to be an effective solution to bring healthcare to where it is most needed, as seen most recently during the COVID-19 pandemic.⁴ Given their education and experience, military PAs should understand and leverage their unique value when considering civilian practice. Military PA advantages are supported by research. However, the literature is sparse, and more work is needed to compare civilian programs further and more effectively communicate the holistic value of military PAs.

Training and Certification

Although the first PAs with military ties were trained at a civilian institution, the inception and growth of the Interservice Physician Assistant Program (IPAP) demonstrates a distinct, successful model for PA education. The IPAP continues to be the largest PA program in the world, graduating an average of 180 students annually among three concurrently running classes. Yet, despite its size, research finds IPAP students consistently outperform their civilian peers, including on the PA National Certifying Exam (PANCE), the standardized examination that all graduating civilian and military PA students must pass to begin practicing medicine.⁵ The IPAP is consistently rated amongst the top PA programs nationwide, bolstering institutional acclaim and immediate graduate credibility. As impressive as all of that is, the benefits of military PA training go beyond prestigious school rankings.

Additional Training

Military PAs excel at practicing medicine in the antiseptic, well-lit, climate-controlled hospital or clinic setting. However, their role differs from that of the typical civilian PA because of their versatility to also manage combat trauma, sometimes as far-forward as on the battlefield itself, and often with less ability to immediately confer with other clinicians.^{3,6} In addition to traditional medical training common to all PA schools, military PA students at IPAP also focus on trauma triage and immediate care, prolonged field care, and prehospital improvisation, which are mainly foreign to civilian programs. Follow-on courses in tactical combat medical care, aviation medicine, tropical medicine, and chemical, biological, radiological, and nuclear casualty management provide unique educational opportunities to augment PA learning not often seen in civilian training. Upon completing their initial four-year service obligation, military PAs are credited with practicing everything from treating live tissue limb amputations to practicing while wearing hazardous materials suits. This education emphasizing trauma care and independent medical decision-making distinguishes military PAs from civilian colleagues.

Diverse Experience and Practice

Honed through years of service (typically including those before medical training) and diverse positions following an IPAP graduation, military PAs exemplify cultural characteristics highly sought by civilian employers and patients.³ Chief among these characteristics is versatility and adaptability, something that is frankly expected in prehospital battlefield medicine and austere environments with limited supplies, but less often needed with the routine support and reliability of hardstand medical facilities. Similarly, the military culture requires PAs to function as part of its hierarchical structure, necessitating effective execution of tasks from above while simultaneously leading a subordinate team. Also, rather than operating simply as clinicians like most of their civilian peers, military PAs are constantly multifunctional, juggling clinical, administrative, and instructor roles simultaneously.^{3,6} In addition, military PAs are sought as educators due to their history of developing and teaching thorough medical points of instruction to combat medics, which has, in turn, brought an increased focus on recruiting military veterans into civilian PA programs.^{3,7} Years of working in this environment positions military PAs ahead of their civilian peers, who often do not receive this type of 'cultural education' or experience in their PA curriculum or subsequent professional development.

Long Term Health Education and Training Programs

Military PA value is furthered by the unique nature of the military long term healthcare education and training

(LTHET) programs. LTHET includes the only doctoral-level clinical training fellowships for PAs in the world, the Training With Industry program, and multiple other leadership and systems development opportunities.^{8,9} These opportunities further place military PAs as apex competitors in the civilian market in clinical, academic, and administrative healthcare roles.

CONCLUSION

Considering the certainty that every soldier eventually leaves the military, military PAs must actively prepare for this transition throughout their military careers. IPAP, follow-on short courses, and doctoral-level education make military-experienced PAs uniquely educated in the PA world. Broad clinical and non-clinical duties and professional development further supplement this formal education. Finding civilian opportunities is often eased by a network of professional colleagues developed over a military career, and with successful self-marketing, a military PA can show how they fit most prospective employers' needs. Between more variability in practice settings and pay, the potential for sudden job loss, and the ability to essentially change jobs at will, the life of a civilian PA differs significantly from that of a military PA. It's a different world on "the outside," but armed with the understanding of the value of their first career, military PAs should be confident in achieving success in their second career.

References

1. Office of the US Surgeon General. *Addressing Health Worker Burnout*. Current Priorities of the U.S. Surgeon General; 2022. Accessed January 11, 2024. <https://www.hhs.gov/surgeongeneral/priorities/health-worker-burnout/index.html>
2. Brock D, Bolon S, Wick K, et al. The military veteran to physician assistant pathway: building the primary care workforce. *Acad Med*. 2013;88(12):1890-1894.
3. Brock DM, Wick KH, Evans TC, Gianola FJ. The physician assistant profession and military veterans. *Mil Med*. 2011;176(2):197-203.
4. Bernhardt JM, Chittle M, Marden J, Sawicki D. COVID-19 pandemic creates new roles for advanced practice providers. *Clinical Adviser*. Published December 17, 2020. Accessed January 11, 2024. <https://www.clinicaladviser.com/home/topics/infectious-diseases-information-center/roles-advanced-practice-providers-covid-19-pandemic/>
5. Cody JT, Adamson KA, Parker RL, Morrey SL, Maxwell EE. Performance of military-trained physician assistants on the physician assistant national certification examination. *Mil Med*. 2004;169(1):34-37.
6. Brock D, Evans T, Garcia D, Bester V, Gianola FJ. Veterans as physician assistants. *JAAPA*. 2015;28(11):45-51.
7. Brock DM, Orrahood SA, Cooper CK, Alvitre JJ, Tozier W. Interservice physician assistant program: educators for an expanding profession. *J Physician Assist Educ*. 2017;28 Suppl 1:S66-s70.

8. Military-Baylor Graduate Programs: Physician Assistant. Baylor University. Accessed January 11, 2024. <https://military.robins.baylor.edu/physician-assistant>
9. *Training With Industry Student Handbook*. US Army Human Resources Command. Updated November 8, 2023. Accessed January 11, 2024. <https://www.hrc.army.mil/content/Training%20With%20Industry%20TWI%20Student%20Handbook>

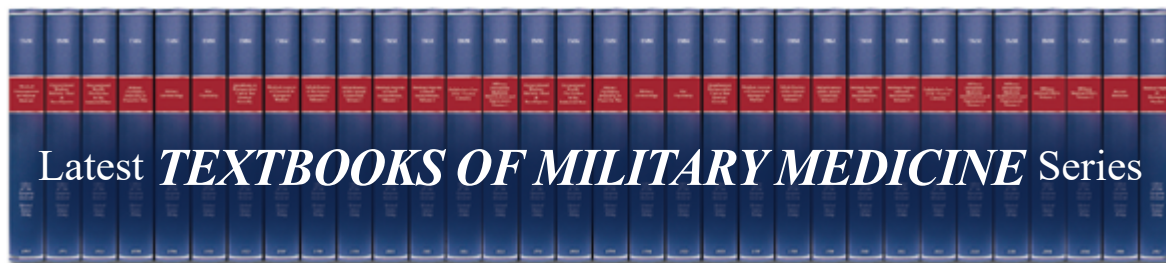
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Modernizing Role 1 Care: Extending Ultrasound to the Battlefield

MAJ (Ret) Jonathan D. Monti, DSc, PA-C; COL Aaron J. Cronin, DSc, PA-C; MAJ Brandon M. Carius, DSc, PA-C

ABSTRACT

Despite significant advances in tactical combat casualty care provision over the past three decades, the integration of novel technologies designed to enhance battalion-level field and combat care over this time has been minimal. Recent data suggest an underutilization of the battalion aid station (BAS) during recent conflicts, leading to renewed interest in the value and role of the BAS in battlefield care provision. Due to its portability, versatility, affordability, and durability, ultrasound is a unique technology that could substantially reshape Role 1 care. Ultrasound's versatile capabilities as a diagnostic and treatment adjunct in resource-constrained environments are well-described, but its potential value to battlefield care provision remains underrealized. We describe how current Role 1 capabilities may limit BAS value and utilization, ultrasound's potential to enhance Role 1 care on future battlefields, and the vital role Army Medical Specialist Corps physician assistants continue to play in addressing the challenges and opportunities to widespread ultrasound adoption to enhance forward military field care.

DEFINING THE PROBLEM

The battalion aid station (BAS) has been integral to combat casualty care since its inception as a frontline clearing station designed to triage, treat, and transport casualties. Although employed initially in this manner during the Global War on Terror (GWOT), the BAS's role in supporting combat operations evolved as combat theaters matured. Despite frequent augmentation with ancillary capabilities generally afforded to higher echelons of care, such as plain radiographs and basic laboratory diagnostics, aid stations and their medical personnel, namely physician assistants, physicians, and combat medics, were increasingly underutilized and relegated to far forward 'sick call' and disease non-battle injury (DNBI) care provision rather than the battlefield trauma role for which they were designed.

A recent analysis of U.S. Department of Defense (DOD) Trauma Registry data by Fisher and colleagues found that between 2007 and 2020, only 3.1% of patients progressed through the BAS, and these casualties were relatively less severely injured.¹ The authors suggest this underutilization was likely the result of frequent bypassing of Role 1 by medical evacuation assets in favor of more robust specialty care assets throughout the studied theaters. The authors attribute these findings to 1) robust in-theater surgical and MEDEVAC asset availability, 2) Defense Secretary Robert Gates' 2009 enactment of the "Golden Hour" policy, and 3) the asymmetric battlefields of the GWOT conflicts during this time.

Fisher and colleagues conclude that additional diagnostic and therapeutic capabilities must be developed to extend survival times during future multi-domain and large-scale combat operations (MDO/LSCO) where the "Golden Hour" may not be achievable.¹

While the BAS's role and utilization in combat casualty care continue to evolve to meet varying battlefield needs (Figure 1), adoption and integration of novel technologies to enhance Role 1 care have been limited, resulting in disproportionate reliance on basic vital sign monitoring and physical examination techniques. Physical examination is notoriously unreliable in assessing many emergent conditions, including non-compressible torso hemorrhage,² pneumothorax,³ and intracranial injury,⁴ undercutting Role 1 trauma assessment accuracy. Portable plain radiography, although potentially available at Role 1, has poor sensitivity and specificity in thoracic trauma assessment, limiting its value to bony fracture evaluation. Reliance on plain radiography and physical examination in trauma significantly diverges from civilian medicine standards of care, where computed tomography (CT) is heavily used to assess multisystem trauma patients rapidly and accurately. While widespread unit-level fielding of car-sized CT machines in the Role 1 setting represents a logistical bridge too far, it nevertheless highlights a growing diagnostic gap between combat casualty and civilian trauma patient assessment. Ultrasound (US), in the hands of skilled PA and physician medical officers, represents a potential solution to bridge this standard-of-care gap.

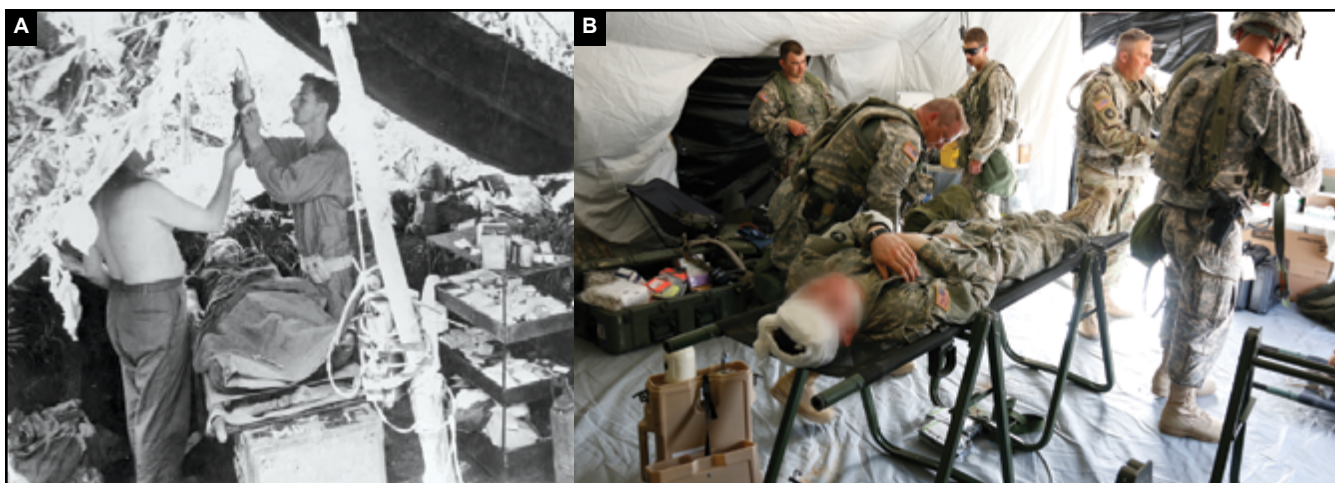


Figure 1. World War II era (A) vs. modern day battalion aid station (B). (A) Photograph reproduced from <https://medicalmuseum.health.mil/index.cfm?p=collections.archives.galleries.index>, (B) Photograph reproduced from <https://www.dvidshub.net/image/4374192/battalion-aid-station>

SOUND AS A SOLUTION

US was first employed for trauma assessments in the 1970s to detect intraperitoneal bleeding using what became known as the focused assessment with sonography for trauma (FAST).⁵ Emergency physicians explored its bedside diagnostic and procedural value in subsequent years. The U.S. DOD formally recognized the potential value of US to combat casualty care when the Defense Advanced Research Projects Agency (DARPA) funded an initiative to develop the first portable US device, which was successfully fielded in 1999.⁶ Combat support hospitals and forward surgical teams successfully fielded and employed these devices to assess casualties at Roles 2 and 3. As US technology improved and portability increased, frontline conventional and special operation forces clinicians recognized that ultrasound's value may extend further toward the point of injury and beyond the FAST.

Ongoing advances in US portability, versatility, durability, and affordability make it an attractive option to enhance austere care in operational environments. US miniaturization and durability enhancements facilitated its integration into smartphone- and tablet-based platforms, which clinicians can easily employ to triage, examine, diagnose, treat, and monitor patients across all medical settings (Figure 2), an application now colloquially known in the medical community as point-of-care-ultrasound (POCUS). Image quality advancements have expanded the utility of US to a wide array of potential Role 1 POCUS applications, such as⁷:

- Triage and evacuation prioritization (incl. mass casualty events).
- Non-compressible torso hemorrhage assessment (ie, FAST).
 - Intra-abdominal.
 - Thoracic.

- Pericardial.

- Traumatic hemothorax and pneumothorax assessment.
- Central and peripheral vascular access enhancement.
- Regional analgesia.
- Advanced airway placement confirmation.
- Resuscitative endovascular balloon occlusion of the aorta (REBOA) placement.
- Musculoskeletal trauma assessment (fracture, tendon injury, etc.).
- Intracranial pressure assessment.
- Additional DNBI applications: pulmonary, skin and soft tissue, biliary, renal, deep vein thrombosis, aortic aneurysm, and ocular emergencies.



Figure 2. MAJ Brian Ahern, an Army DSc Emergency Medicine Physician Assistant assigned to the Madigan Army Medical Center, utilizes POCUS in Southeast Asia in 2019. Photograph reproduced from DVIDS. Photograph by Staff Sergeant Michael O'Neal. <https://www.dvidshub.net/image/5150551/19-2la>

Table 1. An Accuracy Comparison of Currently Available Role 1 Diagnostics for Commonly Encountered Battlefield Trauma Injuries

	Physical exam		Plain radiography		Ultrasound	
	Sens (%)	Spec (%)	Sens (%)	Spec (%)	Sens (%)	Spec (%)
Pneumothorax ^{3,8}	59	96	47	100	91	99
Pericardial effusion/tamponade ^{7,9}	26-82	-	89	-	91	94
Extremity fractures ¹⁰	N/A	N/A	Reference standard		85-100	73-100
Intra-abdominal hemorrhage ^{2,7}	39	90	No demonstrated utility		74	98
Elevated intracranial pressure ⁴	28-76	40-86	No demonstrated utility		94% (AUROC)	

Sens: sensitivity; Spec: specificity; N/A: not applicable; AUROC: area under a receiver operating characteristic

Evidence proving ultrasound's diagnostic value in commonly encountered battlefield traumatic injuries continues to emerge. In addition to the utility of the FAST in NCTH and torso trauma assessment,¹¹ US demonstrates utility in undifferentiated hypotension assessment,¹² endotracheal tube placement confirmation,¹³ central and peripheral venous access,¹⁴ soft tissue and musculoskeletal trauma assessment,^{15,16} intracranial pressure assessment,¹⁷ fracture detection,¹⁸ intraosseous access confirmation,¹⁹ and facilitating regional anesthesia and REBOA placement.^{20,21} Additional military research suggests that US can enhance mass casualty triage and prevent unnecessary MEDEVAC transport.^{22,23} US outperforms currently available methods in nearly all of these use cases and also supports the Army Office of the Surgeon General's (OTSG) medical personnel's individual critical task list (ICTLs). The multifunctional versatility, portability, and accuracy of POCUS as a diagnostic and procedural adjunct far exceeds any current BAS capabilities when utilized by trained clinicians (Table 1). Still, numerous existing challenges limit the widespread adoption of POCUS despite its advantages over currently employed methods and diagnostics.

PHYSICIAN ASSISTANTS AND POINT-OF-CARE ULTRASOUND: CHALLENGES AND OPPORTUNITIES

PAs have been a central feature of modern battlefield medicine since 1972 when they were first introduced to the U.S. Army and assigned to lead and provide battalion-level primary, field, and combat care. This essential and enduring role as soldier-clinicians and primary leaders of frontline care was fortified after the temporary elimination of the battalion surgeon position in 1984. Today, PAs are widely considered the foremost experts in Role 1 care.²⁴ As Specialist Corps medical officers, they continue to play an integral role in the BAS evolution, adeptly defining Role 1 care capabilities to include exploring and expanding POCUS use in military settings.

Formalized POCUS training was first incorporated into Army PA education in 2007 via the Army's Emergency Medicine PA (EMPA, AOC 65DM2) Residency Program.²⁵ Despite growth in utilization, perceived value among emergency clinicians, and emerging evidence demonstrating its potential to enhance emergency care provision, existing barriers limited the widespread adoption and integration of POCUS at Role 1. These barriers centered on a lack of evidence of military-specific clinical value and inadequate expert training opportunities. Overcoming these barriers has required feasibility and value demonstrations, training opportunity generation, technology development and fielding initiatives, PA leadership, and emergency physician colleague support, and Army Medical Department leadership buy-in and fiscal support.

POCUS feasibility and value demonstrations specific to the Role 1 setting have been ongoing since 2008, primarily accomplished via prospective research from the modern Army-Baylor DSc EMPA Residency Program. These studies assessed various aspects of POCUS integration among Role 1 personnel, focusing on various applications, requisite training, and end-user feedback on novel US devices and technology.²⁶⁻³⁵ Savell and colleagues' summative review of military POCUS research, which included several PA-led studies, found military clinicians could perform sonographic studies with reliable sensitivity and specificity and concluded that POCUS could increase diagnostic accuracy and improve care for the warfighter when applied by trained military clinicians.³⁶ This conclusion was further reinforced by a recent analysis of POCUS utilization data within the Joint Trauma System Prehospital Registry.³⁷

POCUS, like any clinical skill, is operator dependent. Justification for its widespread fielding demands that end-users be appropriately and sustainably trained. PA-led training initiatives to overcome this barrier began in 2012 with a year-long POCUS fellowship program established for EMPAs under the OTSG's Long-Term Health Education and Training Program. The fellowship intended to force-generate and employ expert clinician-sonographers to

train frontline clinicians in Role 1-applicable POCUS skills. PA leaders decidedly replicated training standards established by sponsoring EM physician residency and POCUS fellowship programs to ensure rigorous training and skill expertise. These highly trained PAs succeeded in further expanding existing US training in the EMPA Residency program, integrating POCUS into the core Interservice PA program curriculum, enabling training opportunities at clinical training sites, and establishing stand-alone courses designed for clinicians assigned to special operations forces and brigade combat teams.³⁸

In 2020, the U.S. Army Medical Materiel Development Activity (USAMMDA) began the US, field-portable (USFP) defense acquisition program, aiming to develop reliable diagnostic field solutions for trauma and musculoskeletal injuries in austere environments.³⁹ The USFP Integrated Product Team comprises PAs, physicians, PTs, and other device fielding stakeholders, whose development and testing input has been vital in developing a practical, portable, and effective POCUS toolkit to enhance Role 1 care (Figure 3). The goal is to field a lightweight, portable US device at Role 1 by 2025. USAMMDA is also managing a DARPA-led initiative launched in 2021 that seeks to leverage artificial intelligence to create a US device capable of providing novice end-users with a data-centric, automated, real-time image acquisition and diagnostic assistance solution to mitigate the aforementioned training burden more.⁴⁰ The FY22 National Defense Authorization Act named POCUS a specific item of interest and the Senate Armed Services Committee encouraged DOD implementation of a POCUS system in the tactical combat casualty care environment.⁴¹ This national-level prioritization of POCUS, largely framed and driven by long-running PA-led initiatives, demonstrates the potential of POCUS to modernize Role 1 care provision.

CONCLUSION

Anticipated LSCO and MDO of future conflicts will likely limit MEDEVAC and surgical specialty care availability, generating prolonged care scenarios that will demand greater skills and technical capabilities of our frontline medical personnel than in previous conflicts. POCUS represents a unique opportunity to expand and adaptably evolve medical force capabilities to meet the shifting demands of complex battlefields. U.S. Army PA-led POCUS initiatives highlight the importance of bottom-up approaches when successfully exploring and integrating innovations designed to meet the challenges of future combat casualty care.

References

1. Fisher AD, April MD, Naylor JF, Kotwal RS, Schauer SG. The battalion aid station-the forgotten frontier of the army health system during the global war on terrorism. *Mil Med*. 2021;usab401. doi:10.1093/milmed/usab401



Figure 3. LTC Brett Gendron, an Army DSc emergency medicine physician assistant assigned to the Brooke Army Medical Center, tests one of four Ultrasound, Field-Portable devices at a test conducted by the U.S. Army Medical Test and Evaluation Activity in 2021. Photograph by Jose Rodriguez, Medical Center of Excellence, Fort Sam Houston, TX.

2. Soyuncu S, Cete Y, Bozan H, Kartal M, Akyol AJ. Accuracy of physical and ultrasonographic examinations by emergency physicians for the early diagnosis of intraabdominal haemorrhage in blunt abdominal trauma. *Injury*. 2007;38(5):564-9. doi: 10.1016/j.injury.2007.01.010
3. Kong VY, Sartorius B, Clarke DL. The accuracy of physical examination in identifying significant pathologies in penetrating thoracic trauma. *Eur J Trauma Emerg Surg*. 2015;41(6):647-50. doi: 10.1007/s00068-014-0484-6
4. Fernando SM, Tran A, Cheng W, et al. Diagnosis of elevated intracranial pressure in critically ill adults: systematic review and meta-analysis. *BMJ*. 2019;366:l4225. doi:10.1136/bmj.l4225
5. Asher WM, Parvin S, Virgilio RW, Haber K. Echographic evaluation of splenic injury after blunt trauma. *Radiology*. 1976;118(2):411-415.
6. Ultrasound devices made in Bothell helping battlefield docs. *Kitsap Sun*. Published September 23, 1996. Accessed January 10, 2024. https://products.kitsapsun.com/archive/2003/0406/114782_ultrasound_devices_made_in_both.html
7. Zak CL, Monti JD. PAs and point-of-care ultrasound: a scoping review. *JAAPA*. 2022;35(4):43-50. doi:10.1097/01.JAA.0000819568.41670.54
8. Chan KK, Joo DA, McRae AD, et al. Chest ultrasonography versus supine chest radiography for diagnosis of pneumothorax in trauma patients in the emergency department. *Cochrane Database Syst Rev*. 2020;7(7):CD013031. Published 2020 Jul 23. doi:10.1002/14651858.CD013031.pub2
9. Roy CL, Minor MA, Brookhart MA, Choudhry NK. Does this patient with a pericardial effusion have cardiac tamponade?. *JAMA*. 2007;297(16):1810-1818. doi:10.1001/jama.297.16.1810
10. Joshi N, Lira A, Mehta N, Paladino L, Sinert R. Diagnostic accuracy of history, physical examination, and bedside ultrasound for diagnosis of extremity fractures in the emergency department: a systematic review. *Acad Emerg Med*. 2013;20(1):1-15. doi:10.1111/acem.12058
11. Netherton S, Milenkovic V, Taylor M, Davis PJ. Diagnostic accuracy of eFAST in the trauma patient: a systematic review and meta-analysis. *CJEM*. 2019;21(6):727-738. doi:10.1017/cem.2019.381
12. Díaz-Gómez JL, Mayo PH, Koenig SJ. Point-of-care ultrasonography. *N Engl J Med*. 2021;385(17):1593-1602. doi:10.1056/NEJMra1916062

13. Gottlieb M, Holladay D, Peksa GD. Ultrasonography for the confirmation of endotracheal tube intubation: a systematic review and meta-analysis. *Ann Emerg Med*. 2018;72(6):627-636. doi:10.1016/j.annemergmed.2018.06.024
14. Stolz LA, Stolz U, Howe C, Farrell IJ, Adhikari S. Ultrasound-guided peripheral venous access: a meta-analysis and systematic review. *J Vasc Access*. 2015;16(4):321-326. doi:10.5301/jva.5000346
15. Gottlieb M, Avila J, Chottiner M, Peksa GD. Point-of-care ultrasonography for the diagnosis of skin and soft tissue abscesses: a systematic review and meta-analysis [published correction appears in *Ann Emerg Med*. 2022 Jan;79(1):90]. *Ann Emerg Med*. 2020;76(1):67-77. doi:10.1016/j.annemergmed.2020.01.004
16. Jackson SS, Le HM, Kerkhof DL, Corrado GD. Point-of-care ultrasound, the new musculoskeletal physical examination. *Curr Sports Med Rep*. 2021;20(2):109-112. doi:10.1249/JSR.0000000000000810
17. Lee SH, Kim HS, Yun SJ. Optic nerve sheath diameter measurement for predicting raised intracranial pressure in adult patients with severe traumatic brain injury: A meta-analysis. *J Crit Care*. 2020;56:182-187. doi:10.1016/j.jcrc.2020.01.006
18. Chartier LB, Bosco L, Lapointe-Shaw L, Chenkin J. Use of point-of-care ultrasound in long bone fractures: a systematic review and meta-analysis. *CJEM*. 2017;19(2):131-142. doi:10.1017/cem.2016.397
19. Tsung JW, Blaivas M, Stone MB. Feasibility of point-of-care colour Doppler ultrasound confirmation of intraosseous needle placement during resuscitation. *Resuscitation*. 2009;80(6):665-668. doi:10.1016/j.resuscitation.2009.03.009
20. Warman P, Nicholls B. Ultrasound-guided nerve blocks: efficacy and safety. *Best Pract Res Clin Anaesthesiol*. 2009;23(3):313-326. doi:10.1016/j.bpa.2009.02.004
21. Chaudery M, Clark J, Morrison JJ, Wilson MH, Bew D, Darzi A. Can contrast-enhanced ultrasonography improve zone III REBOA placement for prehospital care? *J Trauma Acute Care Surg*. 2016;80(1):89-94. doi:10.1097/TA.0000000000000863
22. Wydo SM, Seamon MJ, Melanson SW, Thomas P, Bahner DP, Stawicki SP. Portable ultrasound in disaster triage: a focused review. *Eur J Trauma Emerg Surg*. 2016;42(2):151-159. doi:10.1007/s00068-015-0498-8
23. Rozanski TA, Edmondson JM, Jones SB. Ultrasonography in a forward-deployed military hospital. *Mil Med*. 2005;170(2):99-102.
24. Daymude ML, Mehta S, Gruppo L. Use of emergency bedside ultrasound by emergency medicine physician assistants: a new training concept. *J Physician Assist Educ*. 2007;18(1):29-33.
25. Malish RG: The United States Army battalion surgeon: frontline requirement or relic of bygone era? Fort Leavenworth, KS, Command and General Staff College; 2009. Accessed April 12th, 2022. <https://apps.dtic.mil/sti/pdfs/ADA512526.pdf>
26. Fritz DK, Carius BM, Umar MA, Camacho LW, Hanlin ER, Curtis RA. Femoral pulse ultrasound assessment accuracy by emergency medicine trainees on a porcine model. *Med J (Ft Sam Houst Tex)*. 2021;(PB 8-21-04/05/06):57-61.
27. Driskell DL, Gillum JB, Monti JD, Cronin A. Ultrasound evaluation of soft-tissue foreign bodies by US Army medics. *J Med Ultrasound*. 2018;26(3):147-152. doi:10.4103/JMU.JMU_12_18
28. Ahern BJ, Monti JD, Naylor JF, Cronin AJ, Perreault MD. U.S. Army combat medic eFAST performance with a novel versus conventional transducers: a randomized, crossover trial. *Mil Med*. 2020;185(Suppl 1):19-24. doi:10.1093/milmed/usz277
29. Simmons CJ, Mack LD, Cronin AJ, Monti JD, Perreault MD, Ahern BJ. FAST performance in a stationary versus in-motion military ambulance utilizing handheld ultrasound: a randomized controlled study. *Prehosp Disaster Med*. 2020;35(6):632-637. doi:10.1017/S1049023X20001028
30. Salazar RF, Monti JD, Cronin AJ, et al. Combat medic eFAST with novel and conventional portable ultrasound devices: a prospective, randomized, crossover trial. *Med J (Ft Sam Houst Tex)*. 2021;(PB 8-21-07/08/09):36-43.
31. Meadows RM, Monti JD, Umar MA, et al. US Army combat medic performance with portable ultrasound to detect sonographic findings of pneumothorax in a cadaveric model. *J Spec Oper Med*. 2020;20(3):71-75.
32. LaDuke M, Monti J, Cronin A, Gillum B. Ultrasound detection of soft tissue abscesses performed by non-physician U.S. Army medical providers naïve to diagnostic sonography. *Mil Med*. 2017;182(3):e1825-e1830. doi:10.7205/MILMED-D-16-00306
33. Monti JD, Younggren B, Blankenship R. Ultrasound detection of pneumothorax with minimally trained sonographers: a preliminary study. *J Spec Oper Med*. 2009;9(1):43-46.
34. Monti JD, Perreault MD. Impact of a 4-hour introductory eFAST training intervention among ultrasound-naïve U.S. military medics. *Mil Med*. 2020;185(5-6):e601-e608. doi:10.1093/milmed/usaa014
35. Milton SC, Cronin AJ, Monti JD. Evaluation of glucomannan powder as an ultrasound transmission gel alternative for resource-constrained environments: a prospective, comparative study. *Wilderness Environ Med*. 2018;29(4):446-452. doi:10.1016/j.wem.2018.06.007
36. Savell SC, Baldwin DS, Blessing A, Medellin KL, Savell CB, Maddry JK. Military use of point of care ultrasound (POCUS). *J Spec Oper Med*. 2021;21(2):35-42.
37. Myers MA, Chin EJ, Billstrom AR, Cohen JL, Van Arnen KA, Schauer SG. Ultrasound at the role 1: an analysis of after-action reviews from the prehospital trauma registry. *Med J (Ft Sam Houst Tex)*. 2021;(PB 8-21-07/08/09):20-24.
38. Brooks D. Army medics learn to use ultrasound on battlefield. EMS World. Published 2016. Accessed January 10, 2024. <https://www.hmpgloblearningnetwork.com/site/emsworld/news/12195915/army-medics-learn-to-use-ultrasound-on-battlefield>
39. Rodriguez J. usamteac conduct tests utilizing smart phones and tablets. US Army. Published 2021. Accessed January 10, 2024. https://www.army.mil/article/251523/usamteac_conduct_tests_utilizing_smart_phones_and_tablets
40. Researchers selected for point-of-care ultrasound program. DARPA. Published 2021. Accessed January 10, 2024. <https://www.darpa.mil/news-events/2021-05-04>
41. FY22 NDAA Report. Armed-services.senate.gov. Published 2022. Accessed May 4, 2022. <https://www.armed-services.senate.gov/imo/media/doc/FY22%20NDAA%20Report.pdf>

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Army Medical Specialist Corps Transformation to Support Large-Scale Combat Operations

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ABSTRACT

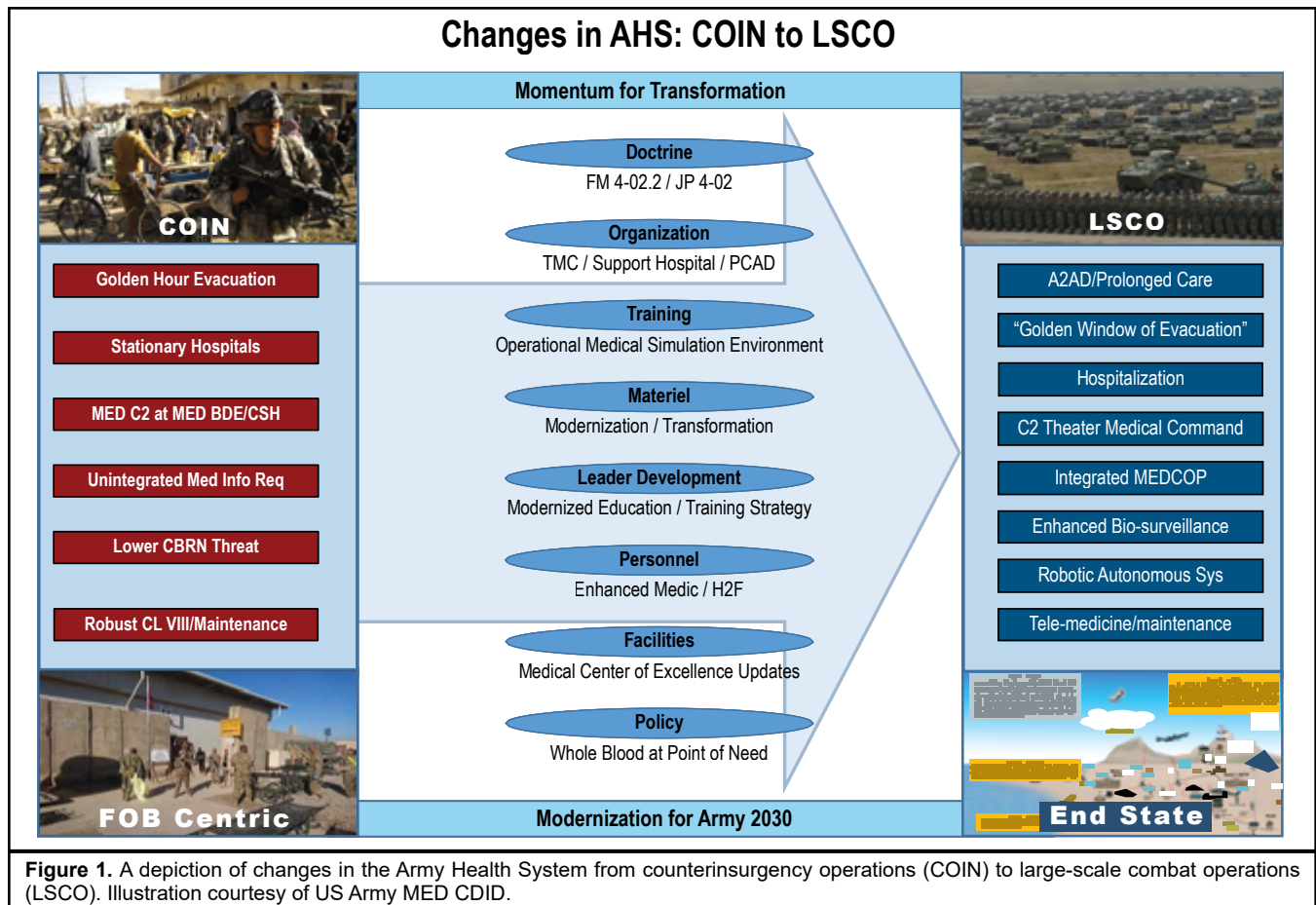
Army Medicine and the Army Medical Specialist (SP) Corps are undergoing a significant transformation to address the challenges posed by the shift from counterinsurgency operations to large-scale combat operations. This article examines the future transformation of the SP Corps to support Army Medicine priorities, highlighting key areas of focus, including evaluating the future transformation and operating environment; Prolonged Care Augmentation Detachments; Holistic Health and Fitness; developing cutting-edge chemical, biological, radiological, nuclear, and high yield explosives countermeasures; and maximizing return-to-duty rates. Comprised of highly qualified professionals, the SP Corps plays a critical role in supporting Army Medicine's priorities for prolonged care scenarios, optimizing evacuation, and conserving the fighting strength. The article emphasizes the importance of continuous adaptation and transformation, detailing the SP Corps' proactive approach to designing innovative training programs and curricula to support these priorities. By doing so, the SP Corps helps to ensure the health and readiness of soldiers, effectively contributing to the evolution of the Army Health System and meeting the ever-changing landscape of threats in the modern era.

INTRODUCTION

In an era characterized by escalating global tensions, the Military Health System (MHS) and Army Health System (AHS) are rapidly shifting their focus from supporting counterinsurgency (COIN) operations to addressing the complexities of large-scale combat operations (LSCO) (Figure 1). Through comprehensive experimentation, the MHS and AHS have identified the urgent need to accelerate advancements in critical capabilities such as hospitalization, prolonged care, and countermeasures against chemical, biological, radiological, nuclear, and high yield explosives (CBRNE) threats. To ensure the Army Medical Specialist (SP) Corps is ready to meet these future requirements in support of MHS and AHS, the SP Corps has been proactively addressing these challenges by undertaking an in-depth evaluation of its roles and responsibilities within the LSCO environment, striving to bridge these gaps and reinforce Army Medicine. As a vital partner in both the MHS and AHS, the SP Corps officers are dedicated to delivering essential expertise and medical support in a wide range of operational scenarios, especially when evacuation is delayed.

The SP Corps brings together a diverse group of highly qualified commissioned officers with graduate professional degrees, including occupational therapists (OT), physical therapists (PT), registered dietitians (RD), and physician assistants (PA).¹ These allied health professionals are critical in supporting Army Medicine's priorities for prolonged care scenarios, maximizing return-to-duty rates far forward, optimizing evacuation, and conserving the fighting strength. They are equipped to address the physical and mental challenges faced by soldiers in austere conditions and provide life-saving care for patients with survivable wounds, injuries, and illnesses when evacuations are postponed.

SP Corps officers take a proactive approach by designing cutting-edge training programs and curricula in concert with the Medical Capability Development and Integration Directorate (MED CDID) and the Army Medical Department Center of Excellence (MEDCoE). These efforts aim to equip future formations with the necessary skills and knowledge for efficient support in LSCO environments. By assessing the distinct capabilities offered by



SP Corps officers, the Corps is ensuring we can support Army Medicine's priorities in a future LSCO environment.

This article delves into the requirements of the SP Corps officers, exploring how it aims to enhance support for Army Medicine and combatant commanders during LSCO. Key areas of focus include evaluating the future operating environment, Prolonged Care Augmentation Detachments (PCAD), Holistic Health And Fitness (H2F), maximizing return to duty (RTD), and developing cutting-edge CBRNE countermeasures. Through continuous adaptation and transformation, SP Corps officers are ready to play a vital role in the evolution of the MHS and AHS, safeguarding the health and readiness of soldiers.

FUTURE TRANSFORMATION

Recognizing the need for transformation, the MHS and AHS are revamping their formations, equipment, and training to support future LSCO effectively. SP Corps officers provide essential care to patients with survivable wounds, injuries, and illnesses when evacuations are delayed and prioritize treatment for injured or ill soldiers when resources are limited. The SP Corps team plays a crucial role in

maintaining the force's readiness by ensuring soldiers stay healthy and perform optimally. Each of the four specialty areas of concentration (AOC) within the SP Corps possesses unique skills that enable them to provide prolonged care and maximize return-to-duty rates, sustaining life until evacuation is feasible.^{1,2}

Occupational Therapists (65As) enhance readiness by addressing combat operational stress reactions, managing mild traumatic brain injuries, improving mental and sleep readiness, and fabricating splints and braces for upper body support. They also offer rehabilitation for physical limitations and basic/instrumental activities of daily living (B/I ADL) skills.

Physical Therapists (65Bs) evaluate, treat, and prevent neuromusculoskeletal (NMSK) disorders, serving as orthopedic experts in managing NMSK injuries. They train battalion medical teams in NMSK evaluation and treatment and educate soldiers and leaders on human performance optimization and injury prevention. As part of H2F teams, physical therapists manage physical profiles and facilitate rapid RTD for NMSK injuries.

Registered Dietitians (65Cs) play an integral role in managing field feeding programs, ensuring theater feeding system

compliance with nutritional guidelines, handling nutritional requirements for prolonged care, and assisting in preventing and treating foodborne illnesses and diseases. They are responsible for reporting and tracking dietary supplement issues and guaranteeing proper use of caffeine, combat rations, and hydration.

Physician Assistants (65Ds) reinforce damage control resuscitation and damage control surgery teams and provide essential expertise in Tactical Combat Casualty Care implementation and training for medics. Additionally, they address and prevent diseases and non-battle injuries (DNBI) to maintain soldier health. With a strong emphasis on bolstering battalion medical team readiness, Physician Assistants contribute to soldier-centered healthcare teams through care delivery and comprehensive healthcare team training initiatives. This multifaceted approach ensures that medical teams are optimally prepared to surmount the unique challenges of contemporary and future combat scenarios.

Casualty rates during World War I far exceeded contemporary conflict casualty rates.³ Historically, soldiers succumbed to battle wounds as well as the complications of diseases, dehydration, starvation, immobility, and infections due to a lack of adequate care while awaiting evacuation to higher levels of care. Since then, significant advancements in battlefield medicine have improved survivability. SP Corps officers address the gap in prolonged care that was unmet in past LSCO environments.

By embracing transformation and adaptation, The SP Corps will play a pivotal role in transforming the MHS and AHS to meet the challenges of future operational environments and force health protection measures. Through the expertise of its various specialists, the SP Corps will not only provide crucial medical support during LSCO but also ensure the health and readiness of soldiers in the face of complex and evolving threats.

FUTURE OPERATING ENVIRONMENT

As the Army faces an increasingly complex and challenging operating environment, the AHS and SP Corps Officers work together to develop and enhance knowledge, skills, and capabilities to provide prolonged care, reduce hospitalization rates, and maximize initial treatment for expedited recovery. We are developing and teaching skills required to provide world-class prolonged care in the face of contested logistics, assist in evacuation optimization, and maintain the force's readiness during all phases of the war.

The SP Corps officers are critical in the Army's ability to provide medical care in prolonged care scenarios, minimizing morbidity and mortality among soldiers. With their expertise, skills, and resources, our Corps remains



Figure 2. SP Officers train for prolonged care at Fort Wainwright, AK. The recently developed freeze-dried plasma (FDP) training package has garnered excellent feedback from various battalions and platforms during the Joint Pacific Multinational Readiness Center (JPMRC) exercise. Captain David Reynhout, Physician Assistant of the 725th Brigade Support Battalion, 2nd Brigade, 11th Airborne Division, praised the effectiveness of the FDP and its adaptability to their unique environment. Photograph courtesy of COL James Jones.

essential in maintaining the health and readiness of the force amidst the complex and challenging operational landscape (Figure 2). This necessitates a departure from time-driven constructs. To keep pace with the rapidly evolving operational environment, the AHS is transforming in manning, equipping, and training to overcome the demands of multidomain operations.

MEDICAL SPECIALIST CORPS AND MULTIDOMAIN OPERATIONS

As the Joint Force addresses adversaries challenging international norms across the competition continuum, US forces will engage in operations within an operational environment defined by four interconnected characteristics⁴:

1. Adversaries will contest all domains, including cyber, space, air, land, sea, the electromagnetic spectrum, and the information environment, thereby threatening US dominance.
2. Smaller armies will confront an expanded, increasingly lethal, and hyperactive battlefield.
3. Nation-states will struggle to exert influence within a politically, culturally, technologically, and strategically complex setting.
4. Adversaries will compete more frequently below the threshold of armed conflict, making deterrence more challenging.

These characteristics enable adversaries, particularly near-peer threats such as China and Russia, to blur the distinction between peace and war and expand the battlefield across time, domains, the electromagnetic spectrum, the information environment, and geographical locations.⁴ Adversaries can extend competitive spaces into the homeland, creating tactical, operational, and strategic stand-offs that separate US forces and allies in terms of time, space, and function. This extension allows them to achieve their objectives before friendly forces can effectively respond and emphasizes the need for multidomain operations.

The concept of multidomain operations has evolved through incremental changes in doctrine as the operational environment has changed over the past forty years. Army Field Manual (FM) 3-0 has codified the multidomain approach to operations, building on previous Army operational concepts such as air land battle, full spectrum operations, and unified land operations. The multidomain operations concept emphasizes the combined arms employment of capabilities from multiple domains, and the transformation of the SP Corps and AHS is critical in supporting current and future warfighters.⁵

SP Corps officers provide four essential functions to support warfighters:

1. They deliver care from the moment of injury or illness and across the entire care continuum. This approach enables soldiers to recover from their wounds, injuries, and illnesses even when evacuations are postponed.
2. They provide vital behavioral health in prolonged care situations.¹
3. They assist in prioritizing the care of injured or ill soldiers when resources are limited and significantly influence the quality of care provided from the moment of injury or illness.
4. Their efforts reduce morbidity and mortality while optimizing return-to-duty rates, ultimately supporting the success of the Army's ever-evolving operational environment.

These are critical elements in "Conserving the Fight Strength" in a LSCO environment where the air space is contested, as both evacuation of casualties and reinforcement of troops will be hindered. Therefore, the country maximizing RTD will have a competitive advantage.

HOLISTIC HEALTH AND FITNESS: ENHANCING READINESS WITH INTEGRATED MEDICAL SPECIALIST CORPS OFFICERS

The US Army's Holistic Health and Fitness (H2F) program is a revolutionary approach to military readiness, emphasizing

a holistic approach to physical, mental, and emotional health.⁶⁻⁸ This comprehensive shift is significant not only within a garrison environment but also in enhancing human capacity during extended operations. The future of military achievement hinges on the capability to prolong soldiers' peak performance in deployed scenarios, ensuring that they remain physically and emotionally resilient and maintain decision dominance.

Pivotal Role of the Specialist Corps in Garrison

The H2F SP Corps team is instrumental in executing the H2F program. They collaborate closely with government service personnel, contract strength and conditioning coaches, athletic trainers, physical therapists, occupational therapists, registered dietitians, and cognitive performance experts. This synergistic, multidisciplinary team assists unit leadership in developing custom plans that bolster soldier health and readiness. Such an all-encompassing approach to wellness in garrison settings lays the foundation for superior performance during competition, crisis, and conflict.

Broadening Holistic Health and Fitness Principles to Deployed Environments

As the Army evolves to meet future battle exigencies, it becomes imperative to extrapolate H2F principles and the support of the H2F SP Corps team from garrison to deployed settings. This extension calls for meticulous planning, adaptability, and interbranch collaboration. Soldiers in deployed environments grapple with unique challenges, including elevated stress, resource scarcity, and heightened demands on their physical, mental, and emotional faculties. Adapting the H2F program to these distinct needs is pivotal in maintaining optimal functionality and sustaining readiness during extended operations while ensuring early intervention and RTD for those with a disease non-battle injury or illness.

Boosting Performance during Large-Scale Combat Operations

Optimal readiness in LSCO scenarios is critical for joint warfighters. Incorporating the H2F SP Corps team and H2F principles into these operations ensures that soldiers are well-prepared to tackle the diverse challenges encountered during LSCO. By offering tailored fitness programs, mental health support, and nutritious food options, the Army can extend soldiers' prolonged endurance, thereby enhancing their contribution in high-pressure situations.

The Future of Military Readiness

As the military landscape evolves, the Army must stay abreast of health, fitness, and readiness best practices. By adopting a comprehensive wellness approach, the Army can better equip its soldiers to face the distinctive challenges posed by future conflicts. The expansion of H2F principles and the role of the SP Corps team in H2F aids in optimizing performance during prolonged operations and ensuring the success of the joint warfighting force. The amalgamation

of the H2F SP Corps team and the H2F program into both garrison and deployed settings is integral for augmenting performance during competition, crisis, and conflict. As the military landscape continues to evolve, it is paramount that the Army remains adaptable and committed to supporting the holistic well-being of its soldiers, guaranteeing optimal readiness for upcoming challenges.

MEDICAL SPECIALIST CORPS OFFICERS INTEGRAL TO THE SUCCESS OF PROLONGED CARE IN LARGE-SCALE COMBAT OPERATIONS

The future security environment is poised to present an array of significant challenges that will test nations' resilience and capabilities to safeguard their interests. These challenges span various domains, including the following:

- The proliferation of weapons of mass destruction (WMDs): The increase in the number and variety of WMDs, such as nuclear, biological, and chemical weapons, poses a grave threat to global security and stability.⁹
- The rise of modern competitor states: The emergence of powerful nations with advanced technological and military capabilities will reshape the global geopolitical landscape and intensify strategic competition.¹⁰
- The persistence of violent extremism: Ideologically driven extremist groups will continue to promote and engage in acts of terror, further exacerbating regional and global insecurity.¹¹
- The prevalence of regional instability: Geopolitical tensions, border disputes, and ethnic conflicts may result in localized flare-ups with potential ramifications for international peace and security.¹²
- The escalation of transnational crime: Criminal networks, such as those involved in human trafficking, drug smuggling, and cybercrime, will exploit porous borders and technological advancements to undermine the rule of law and public safety.¹³
- The intensification of competition for resources: As demand for finite resources like water, energy, and minerals grows, disputes over access and control may heighten geopolitical tensions and destabilize regions.¹⁴

PROLONGED CARE EVACUATION

Adversaries will employ various tactics, including unconventional and hybrid strategies, to threaten US security interests. Anti-access and area denial capabilities will make it difficult for the joint force to achieve air and sea dominance and project power onto land from air and maritime domains.¹⁵ This will make it challenging for the medical community to provide rapid casualty evacuation and treatment and may lead to

increased casualty fatality rates. Moreover, it is impossible to predict the specific health threats that may arise in future operating environments, making it critical to prepare for a wide range of potential scenarios. Previous conflicts have shown that DNBI rates can vary significantly, with average daily DNBI admission rates ranging from 0.99 to 4.03 per 1,000 troop strength.¹⁶ These threats must be taken seriously, as their impact on operational forces can be significant and cannot be disregarded.

Occupational therapists, physical therapists, registered dietitians, physician assistants, and the entire MHS have been training extensively to mitigate risks by managing casualty response events in operational scenarios involving delayed evacuation. The team's knowledge and skills will be essential in future conflicts to reduce morbidity and mortality rates.

Prolonged care (PC) refers to medical treatment that extends beyond the current doctrinal planning timelines and is provided using limited resources until the patient can be transferred to a higher level of care.¹⁷ PC guidelines define this term as "the need to provide patient care for extended periods of time when evacuation or mission requirements surpass available capabilities and/or capacity to provide that care."¹⁸ Rapid evacuation remains the preferred method for the Army Medical Department to clear the battlefield and save lives. Still, we must prepare for PC for situations where prevailing doctrine and evacuation plans may fail.

It is important to evaluate the efficacy of PC training programs under realistic conditions, incorporating them with combatant events (Figure 3). By doing so, the AHS and SP Corps can improve their medical readiness and ensure that their personnel possess the required skills and expertise to deliver high-quality medical care in the field. To effectively provide PC, medical personnel must possess, at a minimum, the following core clinical capabilities:

- Ability to monitor patients.
- Capability to resuscitate patients.
- Aptitude to ventilate and oxygenate patients.
- Skill to obtain definitive control of the airway.
- Expertise in performing advanced surgical interventions.
- Competence in administering sedation and pain control.
- Proficiency in conducting physical exams and diagnostic tests.
- Proficiency in providing nursing care, hygiene, and comfort measures.
- Ability to offer telemedicine consultations.
- Proficiency in preparing patients for transportation.¹⁹
- Early mobilization of patients by rehabilitation professionals.²⁰



Figure 3. PC22 National Training Center (NTC). Photograph courtesy of COL James Jones.

SP Corps officers have many of these skills and also offer rehabilitation, behavioral health care, and en-route care capabilities. These capabilities are essential during LSCO and underscore the need for innovative solutions to provide care to wounded soldiers in the field with rapid evaluation, medical stabilization, and early intervention followed by mobilization. Prioritizing the care of injured or ill soldiers during resource-scarce situations is critical to “conserving the fighting strength.” SP Corps officers, trained to provide high-quality medical care even in the most challenging environments, often accomplish this vital task.

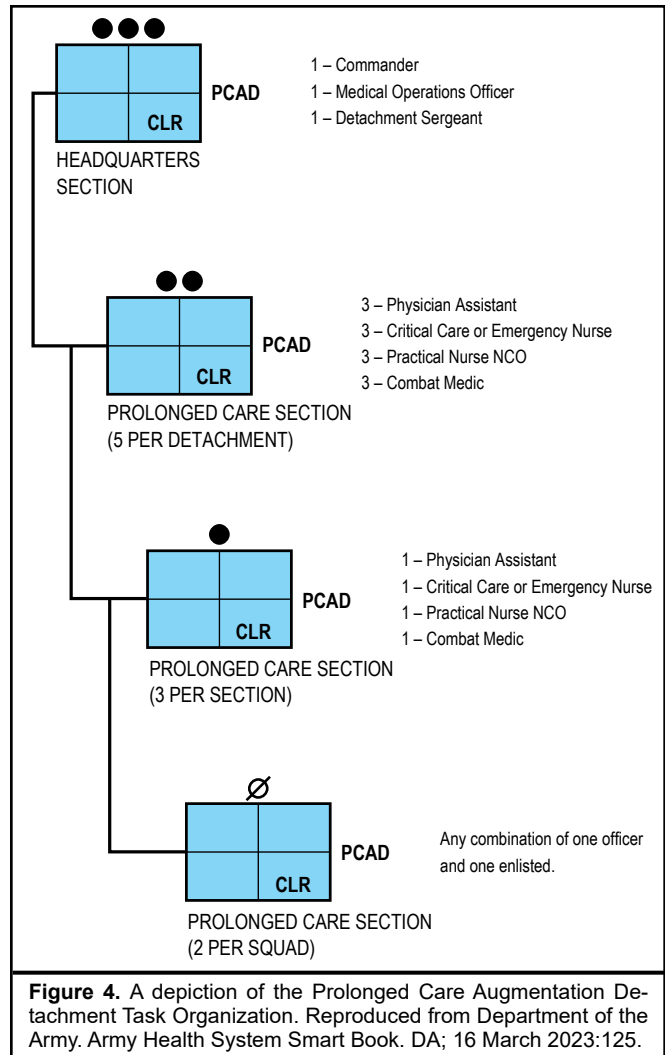
FUTURE CAPABILITY: PROLONGED CARE AUGMENTATION DETACHMENT

The PCAD is a new unit that will be established in the Army in Fiscal Year 2025. The Army will activate three PCADs, one in the COMPO 1 (Active Duty) and two in the COMPO 3 (US Army Reserve). These new units represent an crucial addition to the Army’s medical capabilities, providing critical support for PC and en-route care to patients.

The PCAD will become an essential component of a Corps-aligned Medical Support Brigade and is typically attached to a Headquarters and Headquarters Detachment (HHD) Hospital Center when not deployed operationally.²¹

Elements of the PCAD can also be further attached to a Medical Company (Role 2) to augment their capabilities and support the delivery of high-quality medical care. With their expertise and experience, the PCAD plays a crucial role in enhancing the overall medical support available to troops, ensuring that patients receive care regardless of the operational environment. The Prolonged Care Section comprises twelve highly skilled professionals, divided into three squads of four personnel each (Figure 4). These squads are composed of a physician assistant, a critical care nurse or an emergency room nurse, a licensed practical nurse, and a combat medic.²¹

The Prolonged Care Squad collaborates closely with the Role 2 Brigade Support Medical Company / Medical Company Area Support or attached Forward Resuscitative



Surgical Detachment (Figure 5) and operates on various types of evacuation platforms, such as medical evacuation ambulances, both on the ground and in the air. Additionally, they work on non-standard evacuation platforms used for casualty evacuations or on strategic evacuation aircraft. In addition, Prolonged Care Squads can also be deployed as two teams, each consisting of two personnel, with each team comprising a combination of one officer and one enlisted person. This flexibility in deployment allows for more efficient and versatile use of the team’s capabilities.

MEDICAL SPECIALIST CORPS AND DEVELOPING CBRNE COUNTERMEASURES

Cutting-edge CBRNE countermeasures safeguard lives and ensure the security of nations worldwide. By investing in advanced research and technology, governments and private sector organizations create innovative solutions that can effectively detect, prevent, and mitigate the devastating effects of CBRNE threats. These countermeasures not only encompass

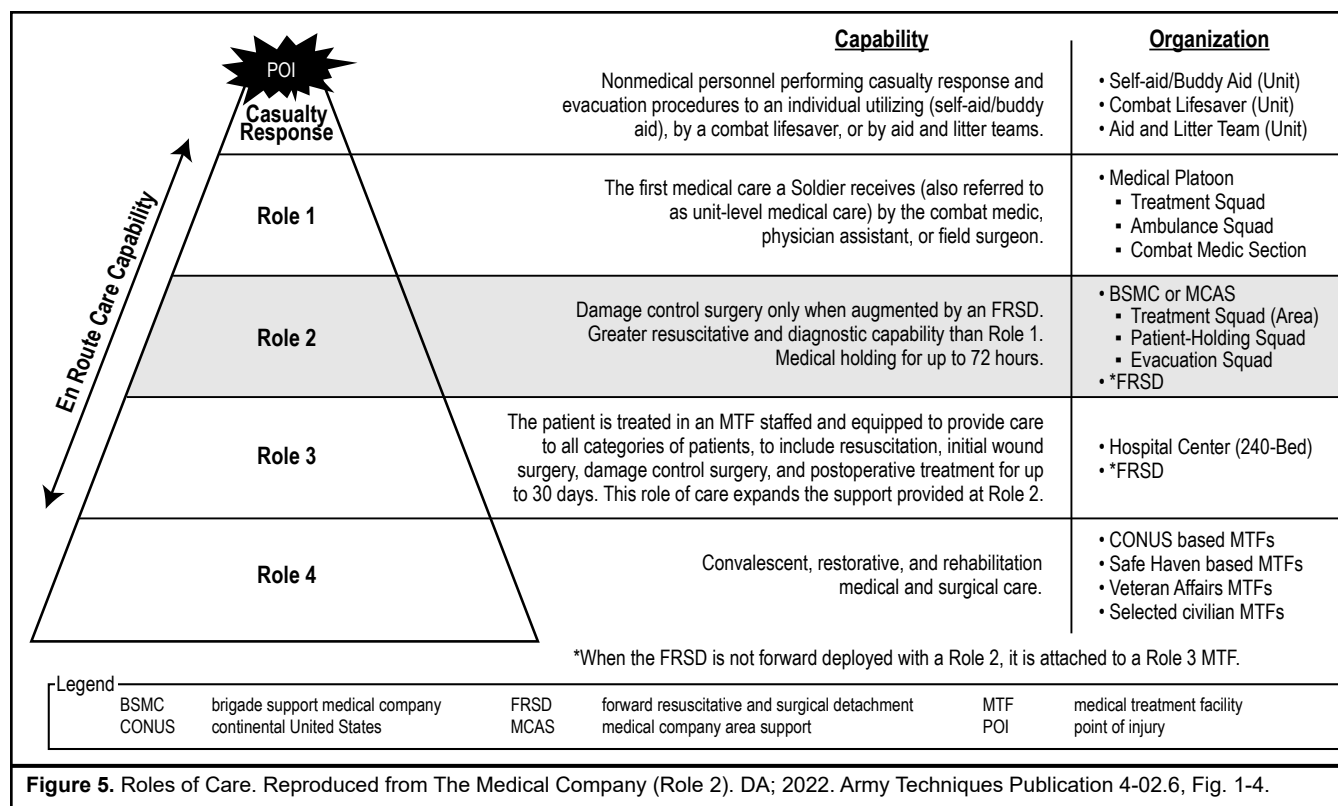


Figure 5. Roles of Care. Reproduced from The Medical Company (Role 2). DA; 2022. Army Techniques Publication 4-02.6, Fig. 1-4.

the development of sophisticated detection systems but also entail novel protective gear, decontamination methods, and medical treatments. As global security transforms into a culture of innovation, cross-disciplinary collaboration in the CBRNE domain will be essential to outpace threats and ensure the safety of civilians and military personnel.

The SP Corps Officers are actively involved in developing cutting-edge CBRNE countermeasures by partnering with organizations such as the MED CDID and the Medical Research and Development Command (MRDC). These teams allow SP Corps officers to contribute their expertise in CBRNE defense to identify, assess, and prioritize capability gaps and develop solutions that address emerging and future threats.

Within MED CDID, SP Corps officers participate in designing and developing doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) solutions for CBRNE defense. They work closely with stakeholders across various military branches, industry partners, and academia to ensure that the latest technological advancements are integrated into CBRNE countermeasure strategies and equipment.

At MRDC, SP Corps officers collaborate with researchers and scientists to develop medical countermeasures against CBRNE threats, including creating prophylactic measures, diagnostic tools, and therapeutics to mitigate the effects of

CBRNE exposure on military personnel and civilians. By combining their knowledge of CBRNE defense with the expertise of the MRDC's research teams, SP Corps Officers contribute to the development of innovative solutions that enhance the resilience of individuals and communities to CBRNE hazards.

Through their work in both MED CDID and MRDC, SP Corps Officers play a critical role in shaping the future of CBRNE defense by ensuring that the most advanced countermeasures are developed, tested, and fielded to protect the lives and well-being of military personnel and the civilian population.

MEDICAL SPECIALIST CORPS ROLE IN MAXIMIZING RETURN TO DUTY

Maximizing the return-to-duty rate of injured or ill personnel in forward operating units is a critical aspect of the AHS's contribution to the reconstitution effort. By prioritizing the health and recovery of combat soldiers, the AHS helps to increase the pool of available personnel for the reconstitution of degraded units. The successful return of injured and/or ill soldiers to duty also helps maintain unit readiness and overall mission effectiveness. In situations where the air space is contested, not only will evacuation of casualties be hindered, but reinforcement of troops will also be limited. Therefore, the country maximizing RTD will have a competitive advantage.

The AHS plays a vital role in ensuring that soldiers receive the highest quality and most timely medical care to facilitate rapid recovery and an expedited RTD.²¹

SP Corps officers understand that it is essential to minimize evacuation and maximize point-of-care treatment and RTD to ensure maximum efficiency and effectiveness. This can be achieved by synchronizing effective medical treatment and evacuation, efficiently clearing battlefield casualties, and prioritizing soldiers' RTD (Figure 6). By returning soldiers to duty as far forward as possible, combat power can be sustained, and forces can maintain a competitive advantage.

“Major emphasis is placed on those measures necessary for the patients to RTD or to stabilize them and allow for their evacuation to the next role of care. RTD refers to a patient disposition which, after medical evaluation and treatment, when necessary, returns a soldier for duty in his unit (FM 4-02). These measures include maintaining the airway, stopping bleeding, preventing shock, protecting wounds, immobilizing fractures, and other emergency measures, as indicated.”²²



Figure 6. Project Convergence. Physician Assistants and combat medics experiment with Prolonged Care solutions to maximize return to duty rates, optimize evacuation ground, air, and sea, and overcome contested logistics. Photograph courtesy of COL James Jones.

Achieving maximum return-to-duty rates for wounded soldiers requires a comprehensive approach that integrates medical treatment and evacuation capabilities across all echelons of military medical care. SP officers can maximize the number of soldiers returning to duty by providing rapid and efficient medical care within the unit's footprint. Experience in Iraq and Afghanistan has shown that many injuries and conditions, including non-battle injuries and diseases, can be effectively stabilized and rehabilitated in theater to return soldiers to combat capability.²³⁻²⁵ However, stabilization and resuscitation alone, without effective rehabilitation and return-to-duty processes for capable soldiers, represents a significant loss of combat power. Therefore, effective rehabilitation integrated into PC maximizes the number of soldiers who can RTD, which helps maintain the force's overall combat effectiveness and sustain the mission's momentum.

This emphasizes the importance of a comprehensive approach to medical treatment and rehabilitation, ensuring that as many soldiers as possible can return to the fight and contribute to the mission's success.

SP Corps officers ensure soldiers are returned to duty as far forward as possible while executing complex problem-solving as a multidisciplinary team to prioritize medical evacuation decisions based on patient acuity and available operational environment resources. This approach requires a coordinated effort from all elements of the military, including medical and non-medical personnel, to ensure that soldiers receive the care they need and are returned to duty as quickly and efficiently as possible.

CONCLUSION

The rapidly evolving global security landscape calls for a paradigm shift in the MHS, necessitating an increased focus on LSCO. The SP Corps has evaluated the capability gaps and has started to transform training to support both Army Medicine and combatant commanders fully. By employing a diverse array of highly qualified professionals, the SP Corps provides invaluable care delivery in PC scenarios, CBRNE countermeasures, and maximizing return-to-duty rates, all crucial to the success of joint warfighters in LSCO.

Maximizing return-to-duty rates is paramount, as it directly impacts the effectiveness of the armed forces in the field. SP Corps officers are dedicated to optimizing the return-to-duty process, ensuring that soldiers receive timely and comprehensive care, enabling them to rejoin their units as quickly and safely as possible. Maximizing RTD equates with the resilience of the armed forces in the face of complex global challenges.

As SP Corps officers design cutting-edge training programs and curricula to adapt to the future operating environment, they enhance their capabilities in areas such as PCAD, H2F, and CBRNE countermeasures. The continuous transformation of the SP Corps shapes the evolution of the MHS and AHS, ensuring the health and readiness of soldiers across diverse and complex threats of current and future environments. Through their dedication, expertise, and unwavering commitment to innovation, the SP Corps stands poised to redefine Army Medicine and strengthen the resilience of joint warfighters in the face of emerging global challenges.

References

1. US Department of the Army. *Army Medical Department Officer Career Management Smartbook, Specialist Corps*. DA; 2022. Accessed January 9, 2024. <https://www.milsuite.mil/book/groups/smartbook-600-4>
2. US Department of the Army. *Theater Hospitalization*. DA; August 14, 2020. Army Techniques and Procedures 4-02.10.

3. Carey, M. Cushing and the treatment of brain wounds during World War I. *J Neurosurg*. 2011;114(6):1495-1501. doi: 10.3171/2011.1.jns101259
4. US Department of Defense. *Summary of the 2018 National Defense Strategy of the United States of America*. DOD; 2018. Accessed January 9, 2024. <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>
5. US Department of the Army. *Operations*. DA; October 2022. Field Manual 3-0.
6. US Department of the Army. *The U.S. Army Holistic Health and Fitness Operating Concept: The U.S. Army's System for Enhancing Soldier Readiness and Lethality in the 21st Century*. DA; 1 October 2020.
7. Chairman of the Joint Chiefs of Staff. *Chairman's Total Force Fitness Framework*. CJCS; September 1, 2011. CJCS Instruction 3504.01.
8. Brading T. Holistic health added to Army fitness doctrine. *Army News Service*. September 30, 2020. Accessed May 17, 2023. https://www.army.mil/article/239475/holistic_health_added_to_army_fitnessDoctrine
9. United Nations Office for Disarmament Affairs. Weapons of Mass Destruction. Accessed January 9, 2024. <https://www.disarmament.unoda.org/wmd>
10. Council on Foreign Relations. Competition between Major Powers. Global Conflict Tracker; January 28, 2020. <https://www.cfr.org/global-conflict-tracker/conflict/competition-between-major-powers>
11. National Consortium for the Study of Terrorism and Responses to Terror. Global Terrorism Database. Accessed July 23, 2023. <https://www.start.umd.edu/gtd/>
12. International Crisis Group. Crisis Watch. Accessed July 23, 2023. <https://www.crisisgroup.org/crisiswatch>
13. United Nations Office on Drugs and Crime. *Transnational Organized Crime: Let's Put Them Out of Business*. Accessed July 23, 2023. <https://www.unodc.org/toc/en/crimes/organized-crime.html>
14. National Intelligence Council. *Global Trends 2040: A More Contested World*. Published March 2021. Accessed July 23, 2023. https://www.dni.gov/files/ODNI/documents/assessments/GlobalTrends_2040.pdf
15. US Army Training and Doctrine Command. *The U.S. Army Operating Concept: Win in a Complex World, 2020-2040*. TRADOC; 7 October 2014. TRADOC Pamphlet 523-3-1.
16. Blood CG, Jolly R. Comparisons of disease and nonbattle injury incidence across various military operations. *Mil Med*. 1995 May;160(5):258-63.
17. Mould-Millman NK, Keenan S, Dixon J, et al. An Innovative Civilian Research Model to Inform Combat-Relevant Prolonged Casualty Care. *Med J (Ft Sam Hous Tex)*. 2022 Apr-Jun; Per 22-04-05-06(Per 22-04-05-06):62-72.
18. Remley M, Loos P, Riesberg J, et al. *Prolonged Casualty Care Guidelines 2021*. Joint Trauma System. Accessed January 28, 2022. https://jts.health.mil/index.cfm/PI_CPGs/cpgs
19. Mould-Millman NK, Baidwan NK, Beaty B, et al. Prolonged casualty care: Extrapolating civilian data to the military context. *J Trauma Acute Care Surg*. 2022 Aug 1;93(2S Suppl 1):S78-S85. doi: 10.1097/TA.00000000000003675
20. McLaughlin KH, Friedman M, Hoyer EH, et al. The Johns Hopkins activity and mobility promotion program: a framework to increase activity and mobility among hospitalized patients. *J Nurs Care Qual*. 2023 Apr-Jun 01;38(2):164-170. doi: 10.1097/NCQ.0000000000000678
21. US Department of the Army. *Army Health System Smart Book*. DA; 2023. Accessed July 3, 2023. <https://www.milsuite.mil/book/docs/DOC-609342>: 16 Mar 2023.
22. US Department of the Army. *The Medical Company (Role 2)*. DA; November 2022. Army Techniques Publication 4-02.6.
23. Philip JB Jr, Goodman GP, Waterman B, et al. Disease and nonbattle injuries sustained by a US Army brigade combat team during Operation Iraqi Freedom. *Mil Med*. 2010 July;175(7):469-476. <https://doi.org/10.7205/MILMED-D-10-00041>
24. Davis S, Machen MS, Chang L. The beneficial relationship of the colocation of orthopedics and physical therapy in a deployed setting: Operation Iraqi Freedom. *Mil Med*. 2006;171(3):220-223. doi:10.7205/milmed.171.3.220
25. Smith-Forbes EV, Quick CD, Brown KM. Roles of occupational therapists in theater, past and present. *US Army Med Dep J*. 2016 Apr-Sep;(2-16):66-70.

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Appraisal of Clinical Utility for the Mental Readiness Screening Tool

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ABSTRACT

As the Army's Holistic Health and Fitness (H2F) system develops, each profession of the H2F Performance Team must also evolve to fill practice gaps. Developed to fit the emerging needs of occupational therapy's human performance scope of practice, the Mental Readiness Screening Tool for military populations (MRST-M) is a valuable screening tool with good clinical utility. The MRST's performance snapshot allows for subjective soldier self-report on current mental skills, while components of other clinical screens aim to highlight areas of concern that may need further evaluation or referrals. The MRST-M may also be helpful in other military OT mission sets to shape mental readiness and interdisciplinary care plans. Use of the MRST may increase if other units administer it, which may result in the increased ability to compare trends across units and potentially provide relevant comparison outcomes.

INTRODUCTION

Within both garrison and operational environments, soldiers can experience many performance barriers, including stressors, social challenges, and sleep difficulties.¹ These performance barriers can negatively impact critical decisions, team cohesion, physical task performance, and overall mission success.¹ As a strategy to improve these performance problems, the Army developed the Holistic Health and Fitness (H2F) system. The mission of H2F is to utilize the services of dietitians, physical therapists, occupational therapists, athletic trainers, strength and conditioning coaches, and cognitive performance specialists "to build physical lethality and mental toughness to win quickly and return home healthy."² The H2F system provides a holistic approach and is geared towards improvement in the following five domains: physical readiness, spiritual readiness, nutritional readiness, mental readiness, and sleep readiness. The focus of this article is on the domains of mental and sleep readiness (MR).

MENTAL AND SLEEP READINESS

The Army Field Manual 7-22 defines mental readiness as "an individual's or team's ability to think, feel, and act in a manner that optimizes performance in a demanding environment or with occupational and combat-specific tasks."² It includes three components of mental readiness:

1. Cognitive performance skills (eg, cognitive load and attention).
2. Emotional regulation skills (eg, activation, heart rate control, stress control, performance imagery, and positive emotions).

3. Interpersonal skills (relationships, communication, and engagement).

By examining soldiers' performance patterns, such as their habits, roles, and routines, occupational therapists provide interventions to support the components of mental readiness within the context of the soldier's occupation and tasks. Mental readiness training aims to support soldiers, leaders, and teams in developing adaptive responses to challenges, executing effective problem-solving skills under pressure, and accomplishing the mission in complex environments.²

Sleep is crucial for both mental and physical performance. Sleep readiness is based on the principles of sleep duration, timing, and continuity.² Sleep duration refers to the amount of sleep obtained, while continuity relates to uninterrupted sleep.² Both principles demonstrate significant correlations between the brain and the body's ability to function. For the most restorative sleep, the timing should align with the body's natural internal clock in a consistent sleep-wake cycle.² Within combat and operational environments, obtaining consistent and uninterrupted sleep can be difficult. Sleep readiness aims to optimize sleep principles in non-operational environments and to provide guiding principles when mission constraints impact sleep cycles.

OCCUPATIONAL THERAPY ROLE IN MENTAL AND SLEEP READINESS IN THE ARMY

To address MR, the Army has leveraged the skills of occupational therapy providers (OTPs). Army OTPs have a vast scope of practice, including skilled care for upper extremity orthopedics, traumatic brain injuries, clinical behavioral

health conditions, combat and operational stress control, and the developing field of human performance optimization (HPO).

In addition to the traditional roles in rehabilitation, the HPO practice area allows OTPs to lean into improving mental and physical tasks by enhancing performance skills and capabilities. Using HPO practice skills, Army OTPs can address and improve soldiers' MR to achieve the H2F mission.

The objective of HPO OTP interventions is to facilitate soldiers' health promotion and high mental performance skills, also known as mental readiness.² Additionally, Army OTPs focus on addressing the impact of soldiers' sleep readiness on occupations and mental performance. More specifically, OTPs use the mental readiness lens to examine and improve soldiers' performance in their military occupational specialty and standard skills expected of all soldiers, such as marksmanship, land navigation, or physical fitness.

Within the OT evaluation process, the HPO OTPs rely on observations, semi-structured interviews, and other subjective measures to collect information on a soldier's sleep and mental readiness. Currently, HPO is an emerging field for OT, and there are few established screening tools designed specifically to address mental readiness. This limited availability has made it imperative for OTPs within HPO to create screening tools that provide a better understanding of the soldier's mental health and wellness. The Mental Readiness Screening Tool (MRST) is an effort to help standardize the screening and assessment process for Army OTPs within the HPO practice setting. The purpose of this article is to introduce the MRST and propose an appraisal of its clinical utility.

DEVELOPMENT OF THE MENTAL READINESS SCREENING TOOL

The author created the MRST to meet the needs of the Army OT mission in HPO and mental readiness. In 2018, the Army began piloting the H2F system, formerly the Soldier Test and Training Program. The MRST was first used as a simple tool to screen or take a "snapshot" of mental readiness and sleep in soldiers from an infantry battalion. The screen included self-report rating scales and questions on energy level, attention, confidence, fitness, sleep, social support, motivation, leisure skills, and goals.

The MRST was refined for implementation by the H2F mental readiness team within an aviation brigade, which added additional components from validated measures to reinforce the clinical utility of the screen. For example, the MRST consists of questions from the General Anxiety Disorder-7 screen³ (GAD-7), the Patient Health Questionnaire⁴ (PHQ-9), and the Alcohol Use Disorders Indication Test⁵ (AUDIT-C). In conjunction with a safety

screen for suicidal and homicidal ideations, these embedded mental health screens show indications for further clinical screening or referral needs due to anxiety, depression, and alcohol use, respectively. Similarly, embedded into the tool is the Pittsburgh Insomnia Rating Scale 20-Item version⁶ (PIRS-20) to identify the need for further evaluation of sleep behaviors. Appendix 1 shows the current version of the MRST.

To add further rigor to the tool, an MRST response guide, demonstrated in Appendix 2, standardizes actions taken by the OTP to support soldiers' answers on the screen. The response guide includes a stoplight-style system that allows for quick interpretation of screen results paired with appropriate actions. The response guide helps standardize responses to enable both occupational therapists and assistants to administer the screen responsibly.

The administration of the MRST is appropriate for two types of encounters. First, all newcomers to the brigade complete the MRST. Each new soldier is instructed to make an appointment with the H2F mental readiness team to be screened for any potential areas of dysfunction. This allows newcomers to receive referrals, resources, or other interventions needed for health promotion and a successful transition into the unit.

The second encounter type is for OTPs to use on a routine basis to screen soldiers for any possible cognitive performance deficits, mental readiness concerns, or sleep dysfunctions they may be experiencing since their initial intake. In this encounter, the MRST may be used to structure the OT process and goals, in addition to highlighting areas that may benefit from further evaluation or referrals.

CRITICAL APPRAISAL OF CLINICAL UTILITY

Though a simple tool, the MRST has evolved into a well-utilized screening tool with significant relevance to the HPO mission. From 2018-2020, approximately 740 soldiers completed the initial version of the MRST within an infantry battalion. Since December 2020, the aviation brigade used the updated MRST to guide MR interventions to over 1000 soldier encounters. To further assess the clinical utility of the MRST, the measure was evaluated to determine if it met the criteria of aspects in the multidimensional model for clinical utility as described by Smart⁷. The aspects include training and qualifications, monetary cost, time expenditure, practicality and ease of use, acceptability, effectiveness, and relevance.⁷

The most notable benefits of the MRST include the high relevance, practicality, and acceptability within the HPO practice setting. The MRST allows a snapshot of the soldier's performance in sleep, cognitive skills, emotional regulation skills, and interpersonal skills in a short time. The tool is

simple to administer within any setting (in person or virtually) and requires little cost beyond basic office supplies. The time for a client to complete the screen is 10 to 12 minutes on average, with another 10 to 30 minutes for the OTP to review and discuss with the soldier. Based on the multidimensional factors, the MRST seems to possess the necessary clinical utility for screening the soldier while also collecting mental readiness and sleep trends for the unit leadership.

LIMITATIONS

The first limitation of the MRST is the training and qualifications required to administer the screening tool. The OTP must have knowledge of HPO, clinical mental health skills, and an understanding of the population being screened. Additionally, OTPs require a clear understanding of when to refer to an outside resource, such as a behavioral health provider, medical provider, or other organization resource. The MRST scoring guide identifies safety concerns using a stoplight-style system to increase interrater reliability and clearly delineate when to refer. This scoring guide and system highlight red flags and provide required actions.

The second limitation is the ability to compare the MRST results or data against different units or populations. For example, to use the MRST as a newcomer's screen, one must first acquire approval and compliance from the unit leadership. Even when approved by higher echelons, compliance within lower unit levels can vary. This can create difficulty in gathering accurate data trends across the brigade's lower unit levels. Similarly, the larger Army organization does not have a standard mental health screen.

FUTURE DIRECTIONS

The MRST is a screening tool that will continue to be refined as the OTP HPO mission matures within the Army's H2F program. In addition, the MRST may prove useful within the combat and operational stress control (COSC) mission, where OTPs provide skilled OT services ranging from interventions for mental health dysfunction to health

promotion within garrison and operational or deployed environments. As described by Smith-Forbes et al.⁸, the primary COSC functions for OTPs are education and consultation, prevention skills training, restoration, reconditioning, traumatic event management, and behavioral health care. The MRST may be useful in providing OT mental health education and interventions in one-on-one encounters to increase resilience and coping skills, emotional regulation, and interpersonal skills.⁸

Additionally, OTPs working in other scopes of Army OT may wish to utilize the current or an abbreviated version of the MRST. Mental health concerns are becoming more prevalent across the United States yet frequently go unaddressed, particularly following the COVID-19 pandemic.^{9,10} While military and veteran populations experience a higher than average risk for behavioral health conditions, the COVID-19 impact on anxiety and depressive symptoms due to social isolation, quarantine, and travel restrictions may elevate the mental health risks.¹¹ With this rise in behavioral health symptoms, it is imperative for OTPs in all settings to screen for soldier mental health using tools such as MRST. Since people are more likely to seek care because of physical injury, OTPs in adult physical rehabilitation settings may wish to address mental health concerns for their clients. The MRST may provide an effective, quick screening for OTPs to provide mental readiness and sleep resources for all soldiers and clients.

CONCLUSION

Developed to fit the emerging needs of the OTP HPO scope of practice, the MRST continues to evolve into a valuable screening tool with good clinical utility. The performance snapshot provided by the MRST allows for the development of soldier HPO care plans while highlighting areas of concern that may need further evaluation or referrals. The benefits of improving or restoring soldier health and well-being outweigh the inability to develop inter-brigade trend data. The utilization of the MRST can increase if other units administer it, which may result in an increased ability to compare trends across units and potentially provide relevant comparison outcomes.

Appendix 1. Mental Readiness Screening Tool – Military (MRST-M)

Mental Readiness Screening Tool – Military (MRST-M)

The MRST-M aims to increase your self-awareness on your current mental readiness and performance. Your answers will be used in discussion with your provider and for tracking program data. Encounter may be documented in the medical system of record if responses reach a clinical threshold (ask your provider if you have questions about documentation).

Rank: _____ Name: _____ Phone #: _____ Date: _____

Unit (CO/BN): _____ / _____ MOS: _____ TIS: _____ # Deployments: _____ Gender: _____ Age: _____ DODID: _____

First Line Supervisor Name and Phone Number: _____

(Continues)

Appendix 1. Mental Readiness Screening Tool – Military (MRST-M) (Continued)

1. Rate your current performance using the following scale: 0 = None 4 = Moderate 7 = Very high

Energy Level: 0—1—2—3—4—5—6—7

Overall Confidence: 0—1—2—3—4—5—6—7

Concentration: 0—1—2—3—4—5—6—7

Sense of Purpose: 0—1—2—3—4—5—6—7

Exercise/fitness: 0—1—2—3—4—5—6—7

Support from family/friends: 0—1—2—3—4—5—6—7

Motivation for duty: 0—1—2—3—4—5—6—7

Willingness to change: 0—1—2—3—4—5—6—7

Leisure or hobbies: (write in) _____

2. Over the past month, how often have you been bothered by the following problems? Use the following scale:

(0) Not at all

(1) Several days

(2) More than half the days

(3) Nearly every day

___ Feeling nervous, anxious or on edge

___ Feeling down, depressed, or hopeless

___ Unable to stop or control worrying

Refer to GAD-7 as needed (Spitzer et al., 2006)

___ Little interest or pleasure in doing things

Refer to PHQ-9 as needed (Kroenke et al., 2001)

3. During the past 12 months, including today, did you have thoughts suggesting you would be better off dead or seriously think about trying to kill yourself? ☐ Never ☐ Maybe once ☐ Sometimes ☐ Often

4. During the past 12 months, including today, did you have thoughts about killing another person(s) within your daily work and/or personal life? ☐ Never ☐ Maybe once ☐ Sometimes ☐ Often

5. Over the past year, what major life stressors have you experienced?

☐ Trouble at work ☐ Relationship problems ☐ Legal ☐ Flag ☐ Finances ☐ PCS problems

☐ Pain/Medical Concerns ☐ Special needs family ☐ HT/WT ☐ Other source(s) of stress _____

6. When you have a major life stressor, who do you turn to for help and/or advice? _____

7. Describe your typical alcohol use (AUDIT-C):

a. How often do you have a drink containing alcohol?

☐ Never ☐ Monthly or less ☐ 2-4x per month ☐ 2-3x per week ☐ 4+ times per week

b. How many standard drinks containing alcohol do you drink on a typical day when you are drinking?

☐ 1-2 units ☐ 3-4 units ☐ 5-6 units ☐ 7-9 units ☐ 10+ units

c. Females: How often have you had 6 or more units of alcohol on a single occasion in the last year?

Males: How often have you had 8 or more units of alcohol on a single occasion in the last year?

☐ Never ☐ Monthly or less ☐ 2-4x per month ☐ 2-3x per week ☐ 4+ times per week

8. How often do you use vape, cigarettes, or use other products containing nicotine?

☐ Never ☐ Monthly ☐ Weekly ☐ Daily ☐ Other _____

If yes, what time of day do you use nicotine products? _____

9. How often do you have a drink or take a supplement containing caffeine or energy boosters?

☐ Never ☐ Monthly or less ☐ 2-4x per month ☐ 1-2x Daily ☐ 3-5x Daily

(Continues)

Appendix 1. Mental Readiness Screening Tool – Military (MRST-M) (Continued)

10. Describe your typical sleep patterns:

- a. How many hours do you sleep in a typical night? _____
- b. What is the quality of sleep you get in a typical night? ☐ Good ☐ Fair ☐ Poor ☐ Other _____
- c. Have you ever been observed snoring or gasping for air? ☐ Yes ☐ No ☐ Not Sure
- d. Does your sleep environment enable good sleep? ☐ Yes ☐ Sort of ☐ No ☐ Not Sure

In the past week, how much were you bothered by:	Not at all bothered	Slightly bothered	Moderately bothered	Severely bothered
1. One or more awakenings after getting to sleep	0	1	2	3
2. Not getting enough sleep	0	1	2	3
3. Sleep that doesn't fully refresh you	0	1	2	3
4. Poor alertness during the daytime	0	1	2	3
5. Difficulty keeping your thoughts focused	0	1	2	3
6. Others noticing you appeared tired or fatigued	0	1	2	3
7. Too many difficulties to overcome	0	1	2	3
8. Bad mood(s) because you had poor sleep	0	1	2	3
9. Lack of energy because of poor sleep	0	1	2	3
10. Poor sleep that interferes with relationships	0	1	2	3
11. Being unable to sleep	0	1	2	3
12. Being able to do only enough to get by	0	1	2	3
	Less than ½ Hour	Between ½ to 1 hour	Between 1-3 hours	More than 3hrs or didn't sleep
13. From the time you tried to go to sleep, how long did it take you to fall asleep on most nights?	0	1	2	3
14. If you woke up during the night, how long did it take you to fall back asleep on most nights?	0	1	2	3
	More than 7 hours	Between 4-7 hours	Between 2-4 hours	Less than 2 hours or I didn't sleep
15. Not counting times when you were awake in bed, how many hours of actual sleep did you get during the worst night?	0	1	2	3
	None or 1 day	On 2 or 3 days	On 4 or 5 days	On 6 or all days
16. On how many days did you have trouble coping because of poor sleep?	0	1	2	3
17. Your sleep quality, compared to most people	Excellent	Good	Fair	Poor
18. Your satisfaction with your sleep	0	1	2	3
19. The regularity of your sleep	0	1	2	3
20. The soundness of your sleep	0	1	2	3
PIRS_20 Screening			Total Score:	

11. Name *your* goals for the following areas:

- A. Professional: _____
- B. Personal: _____
- C. For this visit: _____

12. What areas are you interested in learning more about? (Mark that all apply)

- ☐ Sleep Skills ☐ Attention/Concentration ☐ Confidence for Schools or Boards
- ☐ Diet/M meal Planning ☐ Overcoming Burnout ☐ Mindfulness/Meditation
- ☐ General Movement Patterns and/or Ergonomics ☐ Effective Communication ☐ Goal setting and Habit Change
- ☐ Energy/Activation Control ☐ Increasing Motivation

Write in any topic not listed: _____

SM DODID: _____

Provider: _____

Appendix 2. Mental Readiness Screening Tool (MRST), Scoring Guide

Safety	Often	Maybe, Sometimes	Never
Suicidal Ideations	<ul style="list-style-type: none"> Suggested Screening: Columbia Suicide Severity Rating Scale Refer to BH resources If actively in SI, hand-off to BH or escort to emergency services Document as needed by facility 	<ul style="list-style-type: none"> Suggested Screening: Columbia Suicide Severity Rating Scale Consider BH resources Document as needed by facility 	<ul style="list-style-type: none"> Reaffirm protective factors
Homicidal Ideations	<ul style="list-style-type: none"> Suggested Screening: Danger Assessment Tool Refer to BH resources If high risk of HI, hand-off to BH or escort to emergency services Document as needed by facility 	<ul style="list-style-type: none"> Suggested Screening: Danger assessment tool Consider BH resources Document as needed by facility 	<ul style="list-style-type: none"> Reaffirm protective factors
Brief Screen for	Nearly Every Day (3)	More than Half the Days (2) Several Days (1)	Not at all
Depression	<ul style="list-style-type: none"> Suggested Screening: Patient Health Questionnaire-9 (PHQ-9) Refer to Behavioral Health (BH) resources Document as needed by facility 	<ul style="list-style-type: none"> Discuss how stressors listed in #5 may impact current performance Consider BH resources Document as needed by facility 	<ul style="list-style-type: none"> Reaffirm protective factors
Anxiety	<ul style="list-style-type: none"> Suggested Screening: General Anxiety Disorder-7 (GAD-7) Refer to BH resources Document as needed by facility 	<ul style="list-style-type: none"> Discuss how stressors listed in #5 may impact current performance Consider resources for BH referral Document as needed by facility 	<ul style="list-style-type: none"> Reaffirm protective factors
AUDIT-C	All Genders: 8-12pts	Women: 3-7pts Men: 4-7pts	Women: 0-2pts Men: 0-3pts
	Results indicate at-risk alcohol consumption and/or dependence.	Results indicate moderate at-risk alcohol consumption and/or dependence.	Results indicate low risk for hazardous alcohol consumption.
PIRS_20	<ul style="list-style-type: none"> Refer to both PCM and BH/ASAP Follow-up with OTR Provide handout Document as needed 	<ul style="list-style-type: none"> Consider referring to PCM or BH/ASAP Follow-up with OTR Provide handout Document as needed 	<ul style="list-style-type: none"> Reaffirm behaviors Follow-up as needed
	>40pts	20-40pts	0-19pts
	Results indicate consistent distress from sleep problems.	Results indicate moderate distress from sleep problems.	Results indicate minimal distress by sleep problems.
	<ul style="list-style-type: none"> Refer to BH/Sleep Fill in sleep habits Follow-up with OTR Provide handout Document as needed 	<ul style="list-style-type: none"> Fill in sleep habits Follow-up with OTR Provide handout Document as needed 	<ul style="list-style-type: none"> Reaffirm sleep behaviors Follow-up as needed

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References

- Mantua J, Bessey AF, Mickelson CA, et al. Sleep and high-risk behavior in military service members: a mega-analysis of four diverse U.S. Army units. *Sleep*. 2021;44(4):zsaa221. doi:10.1093/sleep/zsaa221
- US Department of the Army. Holistic Health and Fitness. DA; October 1, 2020. Field Manual 7-22. Accessed January 9, 2024pubmed. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30964-FM_7-22-001-WEB-4.pdf
- Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 2006;166(10):1092-1097. doi:10.1001/archinte.166.10.1092
- Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16(9):606-613. doi:10.1046/j.1525-1497.2001.016009606.x
- Bush K, Kivlahan DR, McDonnell MB, Fihn SD, Bradley KA. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. *Arch Intern Med*. 1998;158(16):1789-1795. doi:10.1001/archinte.158.16.1789
- Moul DE, Pilonis PA, Miewald JM, Carey TJ. Preliminary study of the test-retest reliability and concurrent validities of the Pittsburgh Insomnia Rating Scale (PIRS). *Sleep*. 2002;25:A246-247.
- Smart A. A multi-dimensional model of clinical utility. *Int J Qual Health Care*. 2006;18(5): 377-382. doi:10.1093/intqhc/mzl034.
- Smith-Forbes E, Najera C, Hawkins D. Combat operational stress control in Iraq and Afghanistan: Army occupational therapy. *Mil Med*. 2014;179(3):279-284. doi:10.7205/MILMED-D-13-00452
- Reinert M, Fritze D, Nguyen T. *The State of Mental Health in America 2022*. Mental Health America; October 2021.
- World Health Organization. *Mental Health and COVID-19: Early Evidence of the Pandemic's Impact: Scientific Brief, 2 March, 2022*. CDC; 2022. Accessed January 9, 2024. https://www.who.int/publications/i/item/WHO-2019-nCoV-Sci_Brief-Mental_health-2022.1
- Wynn G, Morganstein JC, Jetly R, et al. Military mental health and COVID-19. *J Mil Veteran Fam Health*. 2002;6(suppl 2): 21-26. doi:10.3138/jmvfh-2020-0048

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Strategic Considerations for Using Dietary Supplements in Austere Environments to Enhance Warfighter Readiness

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ABSTRACT

Cardiovascular (CV) and brain health are the foundations to overall health and well-being. Flavonoids, naturally occurring within fruits such as berries, are reported to contain potent antioxidant and anti-inflammatory properties. Mounting evidence has demonstrated health-promoting benefits of berry flavonoids on CV and brain health. The warfighter community with its rising rates of CV and mental health disparities, may benefit from a portable berry flavonoid, blackcurrant, as an addition to their whole-food plant-forward diet. However, there is a lack of research investigating berry flavonoids as a potential nutritional intervention within the warfighter population. Therefore, this paper will examine the current nutrition landscape of the warfighter community, barriers to nutrition education, and potential research-based solutions to optimize health in this community.

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in the United States (US)¹ and impacts approximately 18.1% of active-duty service members with at least one CVD diagnosis or risk factor.^{2,3} Currently, statin therapy is the standard pharmacological treatment used to lower the risk of CVD. However, other effective and safer nutrition interventions may decrease the risk of CVD or augment standard pharmacotherapy.^{4,5} The American College of Cardiology 2019 guidelines⁶ include statin therapy, diet, exercise, blood pressure reduction, and other lifestyle changes when there is a risk factor of death from CVD of greater than 7.5% in 10 years with their multifactorial calculator.⁶ There is a lack of specific nutrition-based interventions designed for the military population. Since dietary supplements are frequently used within the military community, providing evidence-based dietary supplements in addition to a whole-food, plant-forward diet that meets lifestyle demands may serve as an effective solution for promoting cardiovascular and brain health. Evidence suggests that fruits rich in flavonoids possess antioxidant and anti-inflammatory properties that may help mitigate CVD.^{7,8} Notably, flavonoids, such as those found in blackcurrant extract, reduce oxidative stress, inflammation, and inhibit platelet aggregation, which are key to promoting CV and brain health.⁷ However, research studies investigating the

effects of berry extracts on cells that mediate inflammatory or targets of oxidative stress, namely cardiomyocyte (heart) and microglia (brain) cell model lines is lacking. Therefore, new methods should be employed to address this research gap. One way is to test a novel nutritional strategy from a basic sciences approach that may translate to future clinical trials in the military. The new knowledge gained can then be implemented to improve CV and brain health across the military population.

THE PILLARS OF NUTRITIONAL READINESS FRAMEWORK

A conceptual model on flavonoids and military lifestyle considerations is presented below in Figure 1 as it relates to antioxidants, potential health benefits, and operational readiness. The figure depicts a broad-scope perspective across the nutrition landscape within the military environment. First, the military population is increasingly challenged to stay physically fit and operationally ready in an evolving (Figure 1a) pro-inflammatory environment with easy access to fast-food restaurants and convenience retailers across military installations or with limited dietary access while on deployment. Additionally, the military force is facing similar “westernized” dietary concerns on the effects of ultra-processed and processed foods on CV and brain health, as evidenced by rising rates in obesity. A warfighter requires

targeted nutrition education beginning at the accession point of a career and continuing until an exit point as a veteran.

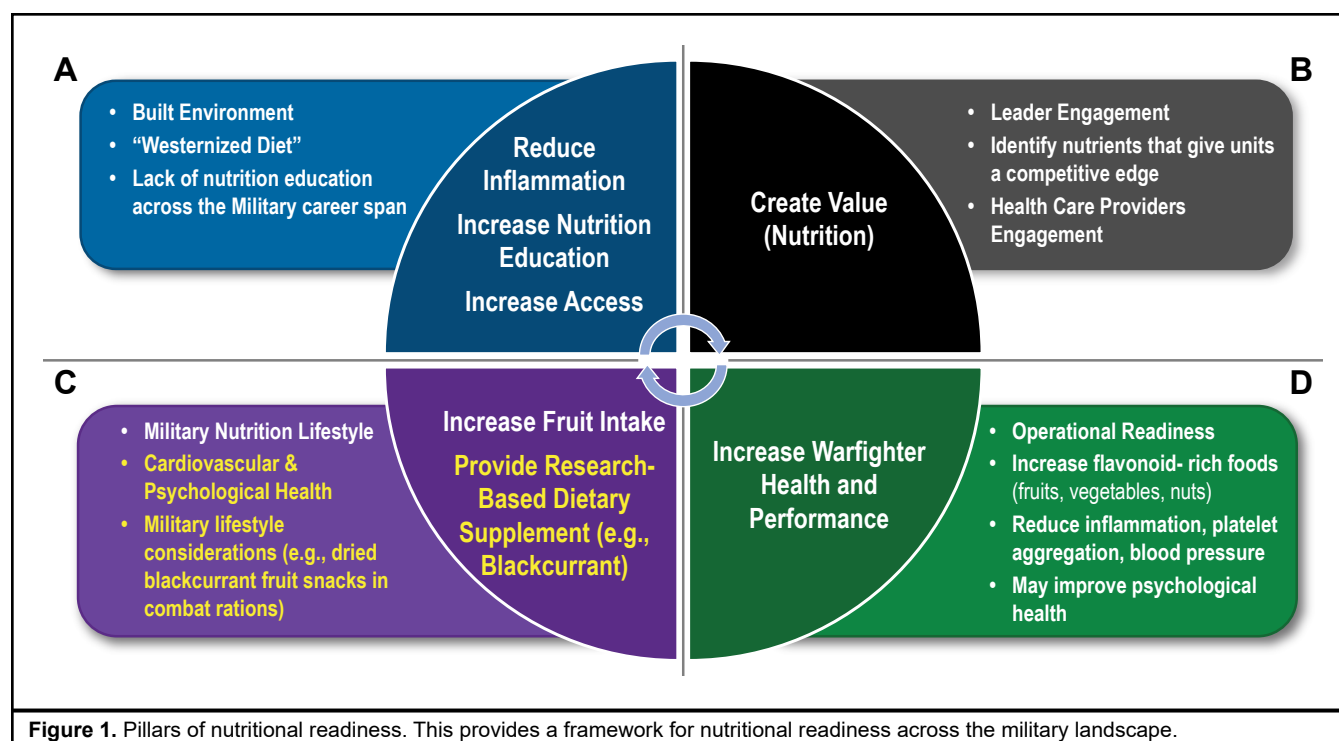
Second, Figure 1b reflects the need to develop strategies from the unit to the leadership level, as well as with health care providers encouraging a culture of health within the military nutrition landscape. Third, Figure 1d connects the operational mission of health readiness to practical strategies of equipping the warfighter with nutrition practices (increasing flavonoid consumption) that may enhance CV and brain health. Lastly, Figure 1c depicts how this current research seeks to increase warfighter health through investigating the benefits of berry extracts and their constituent ingredients at the cellular level.⁹ Future research results will impact warfighter portable dietary considerations.

The model provides a conceptual framework for the barriers to optimize nutrition within a military context. This framework provides a big picture perspective for future human study investigations with a military nutritional lifestyle approach by using a berry flavonoid to improve CV and brain health.

MILITARY LIFESTYLE CONSIDERATIONS AND DIETARY SUPPLEMENT USE

The military community must continually be on alert due to its mission of readiness, which causes potential stressors that negatively impact health. Flavonoid-rich berries, such as blackcurrant, as a dietary supplement, may provide potential health-promoting benefits for this at-risk community. The

military culture is faced with unique operational demands and lifestyle stressors^{10,11} in which military personnel must be physiologically and psychologically fit at all times. In a recent longitudinal study, Jayne et al used 48 months of data from the Stanford Military Data Repository and reported a negative relationship in active-duty military soldiers' health status with stressful life changes and nutrition-related outcomes.¹⁰ For example, stressors, including marriage, adding a child, military separation, deployment, etc, negatively impacted the soldier's lipid profile, contributed to weight gain, and were associated with nonmedical readiness.¹⁰ The military lifestyle and occupational demands provide a contrast to the civilian population as it relates to nutritional considerations for the military warfighter. In another study, Knapik et al reported that due to the military's requirements for readiness, nearly 75% of military personnel were consuming dietary supplements to better their health and performance.^{12,13} Other primary reasons for military personnel consuming dietary supplements were to increase endurance and energy and promote weight loss.^{12,13} Moreover, although young soldiers were found to use dietary supplements, an older population (age ≥ 40) of soldiers used them more often. This older population included individuals who had advanced education and were likely part of the Special Forces community.¹⁴ The use of dietary supplements by this community presents concerns, some of which include using non-evidence-based supplements, a supplement's exemption from US Food and Drug Administration regulations, inadequate dietary supplement education, the unpredictable combinations of multiple ingredients, and lack of details for proprietary blends.¹⁵ Since dietary supplements are a widely accepted aspect of military culture, a research-based dietary



intervention to supplement a whole-food, plant-forward diet may fit within the military lifestyle to promote CV and brain health.

DISCUSSION

Military Stressors

Personal and environmental stress factors related to military lifestyle may increase oxidative stress and inflammation, which are associated with a rise in CVD and impaired brain health, and could make warfighters medically nonready for deployment.^{16,10,3} Indeed, warfighter medical nonreadiness continues due to the rise in CVD.^{17,2} Examples of health and occupational determinants of CVD in the military include tobacco use, lack of access to fresh fruits and vegetables in deployed environments, environmental exposures, social environments, and consumption of energy-dense (rather than nutrient-dense) diets.^{18,16} Warfighters consuming a poor diet and working in austere environments may be more prone to a pro-inflammatory state.^{16,19,20} Therefore, based on current experimental and clinical studies, providing blackcurrant extract as a dietary supplement may offer an innovative, safe, and adjunctive therapy to standard care (eg, NSAIDs), to reduce inflammatory and oxidative stress processes that contribute to CVD and impaired brain health.

Mental health is a complex topic, especially within the military culture. There is a relationship between oxidative stress, microglial activity, and mental health.⁹ Addressing mental health concerns requires service members to be vulnerable and confront psychological health issues. Wooten et al discovered that a high number of service members purchase behavioral health services outside of military medical facilities.²¹ This could be due to stigma and that being vulnerable is not always consistent with operational demands and varied leadership culture and support.²² Wooten et al showed that the most frequent and highest use of purchased care visits were related to mental health issues of posttraumatic stress disorder (PTSD), anxiety, tobacco use, opioid misuse, and mood disorders.²¹

Importantly, nutrition is an emerging area of science in which to study ways to improve mental health, including depression, anxiety, PTSD, and other neuropsychiatric conditions.¹⁸ With the rise in depression and suicide statistics within the military,^{23,24} seeking nutritional interventions to mitigate these concerns may serve as a practical strategy for increasing mental resiliency. A poor diet can affect psychological health,^{25,26} and supplementation, when possible, of a whole-food diet with berry flavonoids may provide antioxidants to warfighters.^{27,28} Diverse solutions are needed to target mental health issues in the military community by using research-based strategies that will also address ways to reduce mental health stigmatization.²⁹

TRICARE and Dietary Supplement Considerations

Although dietary supplement use could enhance military health, there are limitations to the Military Health System that could make integration of this nutritional strategy difficult. The Military Health System is responsible for delivering care to an estimated 9.5 million military personnel, retirees, beneficiaries, and those eligible for DOD health care under the managed care system of TRICARE.³⁰ TRICARE is essential to warfighters, retirees, and dependents who need medical care. Understanding TRICARE's role as it relates to delivering direct care, accessing health services, and securing high-quality care are essential to informing and developing research strategies. Currently, dietary supplements, such as blackcurrant extract, are not covered under any TRICARE plan. According to TRICARE's policy, individuals requiring nutritional therapy or "medical necessary food" intended to treat specific diseases or conditions would be covered under current policy.³¹ Although this may deter an interest in the research-based dietary supplement approach, it is important to understand that TRICARE does evolve to meet the needs of its customers.

Implications for Research and Practice

Research-based strategies on blackcurrant extract enriched with flavonoids to supplement a warfighter's diet may prove to be worthwhile as the results could be translated and implemented in the future. A blackcurrant extract supplement offers the biochemical properties of anti-inflammatory and radical scavenging activities that may quell pro-inflammatory and oxidative processes.⁷ Another military lifestyle consideration is that a blackcurrant supplement could come in the form of a dietary supplement portable capsule, which may already have a high degree of acceptance within the military culture.¹⁴ This practical and portable solution would meet the needs of the warfighter.

Military Culture, Mental Health, and Berry Considerations

Since the military culture embraces mental and physical toughness characteristics, warfighters often display a level of stoicism and a mission-first attitude,³⁰ which can be perceived to leave little room for taking care of psychological health. As innovative solutions are being considered for this community, it is important to understand how these strategies might fit within the military lifestyle. Emerging research in the areas of mood regulation and mental health includes active topics such as the association between food and mood and its relationship to brain health.³² Whole fruits and vegetables have positive health effects on brain health and well-being,³³ with a particular emphasis on flavonoid-rich berries that may be associated with improved mental health.^{34,35} However, as we consider the military lifestyle, it may be beneficial to supplement a whole-food diet with flavonoid-rich berries. Another benefit of a dietary supplement, whole-food approach is reduced mental health stigmatization, since traditional

approaches and pharmacological interventions may have brought unwanted attention and stigmatization of other treatment options.²⁹ A dietary supplement approach is within the military cultural norm. Whereas warfighters may require additional mental health services (eg, pharmacological and traditional approaches), a dietary supplement would not add to stigmatization.²⁹ Therefore, an opportunity may exist wherein CV and brain health could be potentially optimized through a diet consisting of whole fruits and vegetables and then adding flavonoid-rich berries in the form of a dietary supplement. A dietary supplement could easily be used in austere environments to provide health benefits as an antioxidant. A blackcurrant supplement may offer a more concentrated dose of healthful anti-inflammatory substances that cannot be obtained solely by relying on whole fruit and vegetable consumption throughout the day, especially in the deployed environment. Blackcurrants may help mitigate pro-inflammatory and oxidative processes and potentially contribute to the protection of CV and brain health. Another important factor to consider within this nutrition landscape is nutrition education.

Nutrition education is a critical component to promote the warfighter's nutritional readiness and health. In particular, dietary supplements have become a billion-dollar industry and are marketed for nutritional benefits to both the civilian and the military communities often with little empirical evidence to support their claims. The Food and Drug Administration (FDA) does regulate dietary supplements, but not as stringently as drugs. Under the Dietary Supplement Health and Education Act (DSHEA) of 1994, dietary supplements enter the market with no need to demonstrate safety or effectiveness.^{36,37} Unlike drugs, where safety and efficacy of a drug through human clinical trials has been demonstrated to the FDA prior to coming on the market, such requirements do not exist for dietary supplements. This poses a challenge to the safety and welfare of consumers because it requires users of dietary supplements to be aware of the ingredients in their products. This challenge is amplified when consumer knowledge is inadequate, multiple ingredients are combined, and propriety blends with limited information are the norm.^{15,38} In addition, most dietary supplements have limited research on their benefits: a research-base is often lacking (without the profit-base of pharmaceuticals). Frontline health care providers can also have a large impact on educating patients about the potential risks of dietary supplements. However, providers also need to be knowledgeable and up to date on the latest information; unfortunately, most are not. Educational training for health care providers should be incorporated into their programs of study. A recent Department of Defense Instruction (DoDI) on dietary supplements (DoDI 6130.06) requires dietary supplement education for providers, which may help close this gap.

In conclusion, further rigorous research using innovative nutritional strategies to support the military community with a focus on austere environments is needed on various

dietary supplements to substantiate their health claims. Only with a strong evidence base could we justify their use in the military community.

References

1. Benjamin EJ, Muntner P, Alonso A, et al. Heart Disease and Stroke Statistics-2019 Update: A Report From the American Heart Association. *Circulation*. 2019;139(10):e56-e528. doi:10.1161/CIR.0000000000000659
2. O'Donnell FL, Stahlman S, Oetting AA. 2018. Incidence rates of diagnoses of cardiovascular diseases and associated risk factors, active component, U.S. Armed Forces, 2007-2016. *MSMR*. 2018;25(3):12-8.
3. Shrestha A, Ho TE, Vie LL, et al. Comparison of cardiovascular health between US Army and civilians. *J Am Heart Assoc*. 2019;8(12):e009056. doi:10.1161/JAHA.118.009056
4. Gaudel P, Neupane S, Koivisto AM, Kaunonen M, Rantanen A. Effects of intervention on lifestyle changes among coronary artery disease patients: a 6-month follow-up study. *Nurs Open*. 2022;9(4):2024-36. doi:10.1002/nop2.1212
5. Ornish D, Scherwitz LW, Billings JH, et al. Intensive lifestyle changes for reversal of coronary heart disease. *JAMA*. 1998;280(23):2001-7. doi:10.1001/jama.280.23.2001
6. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA guideline on the primary prevention of cardiovascular disease: a report of the American College of Cardiology/American Heart Association task force on clinical practice guidelines. *Circulation*. 2019;74:e177-e232. doi:10.1161/CIR.0000000000000678
7. Cortez RE, Gonzalez de Mejia E. 2019. Blackcurrants (*Ribes nigrum*): a review on chemistry, processing, and health benefits. *J Food Sci*. 2019;84(9):2387-401. doi:10.1111/1750-3841.14781
8. Tabart J, Franck T, Kevers C, et al. Antioxidant and anti-inflammatory activities of *Ribes nigrum* extracts. *Food Chemistry*. 2012;131(4):1116-22.
9. Currie TL, Engler MM, Olsen CH, et al. The effects of blackcurrant and berry extracts on oxidative stress in cultured cardiomyocytes and microglial cells. *FASEB J*. 2022;36(S1). <https://doi.org/10.1096/fasebj.2022.36.S1.R2805>
10. Jayne JM, Blake CE, Frongillo EA, et al. Stressful life changes and their relationship to nutrition-related health outcomes among US Army soldiers. *J Prev*. 2020;41:171-89. <https://doi.org/10.1007/s10935-020-00583-3>
11. Pflanz SE, Ogle AD. Job stress, depression, work performance, and perceptions of supervisors in military personnel. *Mil Med*. 2006;171(9):861-5. doi:10.7205/milmed.171.9.861
12. Knapik J, Trone DW, Steelman RA, Farina EK, Lieberman HR. Prevalence of and factors associated with dietary supplement use in a stratified, random sample of US Military personnel: the US Military dietary supplement use study. *J Nutr*. 2021;151(11):3495-506. doi:10.1093/jn/nxab239
13. Lieberman HR, Stavinoha TB, McGraw SM, White A, Hadden LS, Marriott BP. Use of dietary supplements among active-duty US Army soldiers. *Am J Clin Nutr*. 2010;92(4):985-95. doi:10.3945/ajcn.2010.29274
14. Deuster PA, Lindsey AT, Scott JM. Dietary supplements: regulatory challenges and issues in the Department of Defense. *Mil Med*. 2018;183(3-4):53-5. doi:10.1093/milmed/usx067
15. Dyball D, Evans S, Boos CJ, Stevelink SAM, Fear NT. The association between PTSD and cardiovascular disease and its risk factors in male veterans of the Iraq/Afghanistan conflicts: a systematic review. *Int Rev Psychiatry*. 2019;31(1):34-48. doi:10.1080/09540261.2019.1580686
16. Clark L, Gi-Taik O, Stahlman S. Cardiovascular disease-related medical evacuations, active and reserve components, US Armed Forces, 1 October 2001-31 December 2017. *MSMR*. 2019;26(1):12-6.

17. Adan RAH, van der Beek EM, Buitelaar JK, et al. Nutritional psychiatry: Towards improving mental health by what you eat. *Eur Neuropsychopharmacol.* 2019;29(12):1321-32. doi:10.1016/j.euroneuro.2019.10.011
18. Karl JP, Armstrong NJ, McClung HL, et al. A diet of US military food rations alters gut microbiota composition and does not increase intestinal permeability. *J Nutr Biochem.* 2019;72:108217. doi:10.1016/j.jnutbio.2019.108217
19. Troncoso MR, Jayne JM, Robinson DJ, Deuster PA. Targeting nutritional fitness by creating a culture of health in the military. *Mil Med.* 2021;186(3-4):83-86. doi:10.1093/milmed/usaa325
20. Wooten NR, Brittingham JA, Pitner RO, Tavakoli AS, Jeffery DD, Haddock KS. Purchased behavioral health care received by Military Health System beneficiaries in civilian medical facilities, 2000-2014. *Mil Med.* 2018;183(7-8):e278-e290. doi:10.1093/milmed/usx101
21. Waitzkin H, Cruz M, Shuey B, Smithers D, Muncy L, Noble M. Military personnel who seek health and mental health services outside the military. *Mil Med.* 2018;183(5-6):e232-e240. doi:10.1093/milmed/usx051
22. Hibbeln JR, Gow RV. The potential for military diets to reduce depression, suicide, and impulsive aggression: a review of current evidence for omega-3 and omega-6 fatty acids. *Mil Med.* 2014;179(S11):117-28. doi:10.7205/MILMED-D-14-00153
23. Shelef L, Korem N, Yavnai N, et al. Depression and impulsiveness among soldiers who died by suicide: A psychological autopsy study. *J Affect Disord.* 2018;235:341-7. doi:10.1016/j.jad.2018.04.068
24. Gómez-Donoso C, Sánchez-Villegas A, Martínez-González MA, et al. Ultra-processed food consumption and the incidence of depression in a Mediterranean cohort: the SUN Project. *Eur J Nutr.* 2020;59(3):1093-103. doi:10.1007/s00394-019-01970-1
25. Sánchez-Villegas A, Toledo E, de Irala J, Ruiz-Canela M, Pla-Vidal J, Martínez-González MA. Fast-food and commercial baked goods consumption and the risk of depression. *Public Health Nutr.* 2012;15(3):424-32. doi:10.1017/S1368980011001856
26. Currie TL, Engler MM, Olsen CH, et al. The effects of berry extracts on oxidative stress in cultured cardiomyocytes and microglial cells: a potential cardioprotective and neuroprotective mechanism. *Molecules.* 2022;27(9):2789. doi:10.3390/molecules27092789
27. Rutledge G, Miller M, Sandhu A, Edirisinghe I, Burton-Freeman B, Shukitt-Hale B. Berry Phenolics Are Associated With Cognitive Enhancement in Blueberry- and Strawberry-Supplemented Older Adults. *Curr Dev Nutr.* 2021 Jun 7;5(Suppl 2):921. doi: 10.1093/cdn/nzab049_034
28. Hernandez SHA, Morgan BJ, Parshall MB. A concept analysis of stigma perceived by military service members who seek mental health services. *Nurs Forum.* 2017;52(3):188-95. doi:10.1111/nuf.12187
29. Tanielian T, Farmer C. The US Military Health System: promoting readiness and providing health care. *Health Aff (Millwood).* 2019;38(8):1259-67. doi:10.1377/hlthaff.2019.00239
30. TRICARE. Medically Necessary Food - For Dates of Service On Or After December 23, 2017. Updated September 27, 2019. Accessed on June 1, 2022. https://manuals.health.mil/pages/DisplayManualHtmlFile/2022-05-24/AsOf/TP15/C8S7_2.html
31. Hendy HM. Which comes first in food-mood relationships, foods or moods?. *Appetite.* 2012;58(2):771-5. doi:10.1016/j.appet.2011.11.014
32. Conner TS, Brookie KL, Carr AC, Mainvil LA, Vissers MC. Let them eat fruit! The effect of fruit and vegetable consumption on psychological well-being in young adults: A randomized controlled trial. *PLoS One.* 2017;12(2):e0171206. doi:10.1371/journal.pone.0171206
33. Barfoot KL, May G, Lamport DJ, Ricketts J, Riddell PM, Williams CM. The effects of acute wild blueberry supplementation on the cognition of 7-10-year-old schoolchildren. *Eur J Nutr.* 2019;58(7):2911-20. doi:10.1007/s00394-018-1843-6
34. Khalid S, Barfoot KL, May G, Lamport DJ, Reynolds SA, Williams CM. Effects of acute blueberry flavonoids on mood in children and young adults. *Nutrients.* 2017;9(2):158. doi:10.3390/nu9020158
35. Dietary Supplement Health and Education Act of 1994, S 784, 103rd Cong (1994). Pub L No. 103-417. Accessed June 5, 2022. https://ods.od.nih.gov/About/DSHEA_Wording.aspx
36. Dwyer JT, Coates PM. Why Americans need information on dietary supplements. *J Nutr.* 2018;148(2):1401s-1405s. doi:10.1093/jn/nxy081
37. Scott JM, Lindsey AT, Costello RB, Deuster PA. Using the dietary supplement label database to identify potentially harmful dietary supplement ingredients. *Nutr Today.* 2018;53(5):229-33. doi:10.1097/NT.0000000000000295

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Spanning Survivability and Readiness: Expanding the Role of the Army Medical Specialist Corps in Large- Scale Combat Operations to Optimize Survivability and Prolonged Field Care

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ABSTRACT

Army Medical Specialist (SP) Corps officers play a vital role in offering a full spectrum of relevant medical options to Army and joint maneuver commanders across the continuum of care (readiness, survivability, and return to duty) by reducing operational risks associated with large-scale combat operations (LSCO). An analysis of current and projected gaps reveals that the SP Corps needs to address its medical capability related to survivability and prolonged field care, referred to in this article as “survivability slump.” Generally, each medical professional in the SP Corps contributes equally to the readiness and return to duty through prevention and evaluation; however, there is a significant gap in the capability to support survivability, which reduces the ability to provide medical sustainment to the combatant commander. This article examines areas of interoperability within the SP Corps and recommends ways to address the medical capability gaps related to survivability to support combat-ready health and the sustainment of warfighters.

INTRODUCTION

Army Medical Specialist (SP) Corps officers have the role of offering a spectrum of medical options to Army and joint maneuver commanders by reducing operational risks associated with large-scale combat operations (LSCO). SP Corps units include four medical professions: occupational therapists, physical therapists, dietitians, and physician assistants. While the value provided by the SP Corps is high in building and sustaining soldier readiness, there remain gaps in the individual critical task list (ICTL) and training requirements to support prolonged field care to increase survivability and return to duty (RTD). Such expertise becomes critically essential during LSCO characterized by “volume, lethality, precision, and tempo” in a setting of contested logistics and uncertainty regarding air superiority for medical evacuation and sustainment. Considering the extensive casualty projections in LSCO, preserving combat power is paramount to facilitate mission success at strategic and operational levels.

A proactive approach to evolving operational environments must ensure the preparedness for LSCO and the need for comprehensive medical support in various phases of conflict. The

need to build and sustain a medically ready force that supports the combat power required of the combatant commander must involve optimizing soldier readiness, survivability, and RTD. Therefore, this article provides a robust medical capability gap analysis and recommends further adaptations in the SP Corps and utilization across Army medicine. Providing medical intervention within each sphere of care reduces the commander’s risk by maximizing ready combat power, which improves the efficiency and effectiveness of each soldier available to execute the mission. SP Corps units span the continuum of care from Role 1 to Role 4; thus, enhanced training on prolonged field care and survivability is integral to bridging the gaps and ensuring a ready medical force.

The Army Medical Specialist (SP) Corps is ensuring its officers are ready to address the projected capability gaps to improve readiness and survivability during LSCO. This article examines three key areas in which the SP Corps enables combat effectiveness during LSCO: readiness, survivability, and RTD. This article also highlights the gaps the SP Corps must address to meet the medical requirements of LSCO. Specifically, this article provides recommendations on unified training requirements and skills necessary across

all SP Corps professions to support survivability and RTD in prolonged field environments. This gap analysis can also serve as a blueprint for Army medicine to maximize mission effectiveness during LSCO.

MINIMIZING COMMANDER'S RISK BY ENABLING READINESS, SURVIVABILITY, AND RETURN TO DUTY

Readiness

Military readiness requires the ability of each soldier to perform military-oriented tasks whenever and wherever needed. The efficient performance of these tasks requires the proper education and physical training while avoiding musculoskeletal injuries (MSKI). MSKIs are the leading health problem for US Army soldiers. In 2018, over 50% of soldiers sought medical care for MSKIs, and MSKIs account for 59% of all limited duty days, approximately 4.1 million days, which represents significant costs to the military.² These costs also translate to the loss of combat power, as MSKIs account for 65% of nondeployable soldiers in the active component.³

The holistic health and fitness (H2F) system is the Army's primary investment in soldier readiness and lethality by optimizing physical and nonphysical performance, reducing injury rates, and improving rehabilitation after injury. The goal of H2F is to increase the overall readiness of the total Army, thus reducing the financial and operational costs associated with MSKIs and subsequent limited duty days. This enterprise-wide readiness system encompasses five domains (physical, mental, nutritional, sleep, and spiritual) under a single governance structure to enable commanders to improve soldier health and fitness. Readiness in these five domains builds the foundational mental and physical toughness that supports soldier lethality.⁴

H2F teams include nutrition, mental readiness, injury control, and unit ministry sections working with brigade staff to support and nest with the commander's intent. Leading the nutrition, mental readiness, and injury control teams are SP officers in the following areas of concentration (AOC): a dietitian (65C), an occupational therapist (65A), and a physical therapist (65B). In June 2023, the Center for Army Lessons Learned handbook on H2F best practices recommended that to maximize effectiveness, the entire H2F team coordinate and synchronize with organic medical providers, which include physician assistants (65D).⁵ Physician assistants, in addition to the highly trained combat medics, are the frontline medical team at the battalion level and are essential partners in ensuring mental and physical health and readiness.

To further extend their influence, many H2F teams offer facilitator or extender courses to selected members of each battalion. These courses provide foundational nutrition, sleep, mental readiness, and injury prevention classes. These course

offerings have the added benefit of H2F teams investing time with the strength and conditioning staff learning proper techniques and implementing programmed physical training (Figure 1). Collectively, SP Corps officers provide a robust, adaptive, and flexible medical capability within the Army Health System (AHS) to support the reduction of MSKIs and improving soldier readiness. In summary, SP Corps ICTL and training requirements fill the gap on optimizing readiness.



Figure 1. Holistic health and fitness (H2F) motor pool. CPT Jon Allen, H2F dietitian, provides nutrition education in a motor pool in Torun, Poland. Photograph by CPT Jaclyn Mazza, H2F Deputy Program Director and Mental Readiness Director, Fort Bliss, TX.

Survivability

Combat survivability refers to a medical system's ability to navigate and endure hostile environments created by human actions, thereby minimizing the risk to combat forces under the command of a combatant commander.⁶ Enhancing survivability through system-based solutions allows combatant commanders to manage higher risks to achieve operational and strategic objectives. However, in the context of hypothetical near-peer conflicts known as LSCO, the AHS has publicly acknowledged its need to transform to address the anticipated volume of casualties.

Overwhelming projected casualty numbers, lengthy transport distances, lack of air superiority, and disrupted communications may reduce the timely efficiency of linear movement along the roles of medical care. Army Techniques Publication (ATP) 4-02.10, *Theater Hospitalization*, states that LSCO may necessitate that patients receive timely medical attention at each role of care to maintain their physiologic status and enhance their chances of survival.⁷ Additionally, decentralized and modular capabilities are necessary for LSCO due to expected missile and electronic warfare targeting. Disbursing medical capabilities and assets will require enhanced medical capabilities of existing providers to fill roles associated with triage and prolonged care of mass casualties.

The case fatality rate (CFR) is a statistical measure commonly employed to assess the survivability of combat casualty care

systems. CFR represents the number of fatal injuries or diagnoses observed within a specific time frame. During the Iraq and Afghanistan conflicts, CFR analysis revealed the effectiveness of tourniquets, rapid evacuation times, blood, and blood products, leading to their prioritization in military training and funding strategies.⁸

Historically, CFR has shown a decrease when comparing initial and final values in a conflict.⁹ Various theories attempt to explain the higher likelihood of death in the early conflict stages, such as the loss of lessons learned or the “Walker Dip” phenomenon.¹⁰ Nonetheless, several factors have been observed: victorious forces inflict more casualties on the enemy while suffering fewer themselves, smaller forces endure higher casualty rates, battle casualties contribute to nonbattle casualties, and the infantry branch historically experiences the highest casualty rates.⁹

SP Corps officers play a vital role in mitigating the risk factors that contribute to increased CFR and decreased survivability. For example, COL George Barbee proposed the strategic survivability triad (SST) to reduce CFR for battle injuries. The SST consists of early interventions, rapid control of noncompressible hemorrhage, and early blood administration.¹¹ While there may be skepticism regarding the practical application of the SST during LSCO with high casualty projections, implementation during the competition phase of the conflict continuum couple improves survivability.

Adequate triage training, suitable for primary or potential secondary theaters of conflict, must also be prioritized for SP officers. Triage in LSCO may require significant changes in the way the AHS trains. Casualties that would have historically been treated and evacuated may instead be categorized as expectant during LSCO due to limited resources. This fundamental shift in triage will require significant training and personnel. Based on how SP officers will be dispersed across the conflict zone, utilizing SP officers could help fill this gap. Teaching SP officers effective triage techniques based on casualty timelines of wounding can be effectively implemented.

With adequate training, SP officers can scale casualty treatment based on the timing of prehospital intervention and injury patterns. The Joint Trauma System conducted casualty analyses using retrospective data to determine triage values based on the time of interventions. A study found that 87.3% of potentially survivable injuries occur in the prehospital environment, with 90.9% of those deaths resulting from hemorrhage.¹² Within the first hour after wounding, 68% of potentially survivable deaths occur, followed by 22% within the subsequent three hours.¹³ These figures emphasize the clinical significance of administering a blood transfusion within 36 minutes, which reduces CFR but does not affect mortality if administered later.¹⁴ Receiving surgical care within one hour is also

clinically significant but does not significantly alter survivability if received later.¹⁵ Training SP Corps officers can help meet treatment timelines; they can meet patients’ needs by managing and supervising the treatment of casualties until their transport to the next level of care.

Effective management of medics and first responders will be crucial to the success of the AHS. Proficiency in the fundamentals of Tactical Combat Casualty Care will be the pillar for effective casualty care in future conflicts (Figure 2). In LSCO scenarios involving delayed or prolonged evacuation, casualties will require extended care without the adequate resources and personnel to sustain trauma care.¹⁶ Prolonged casualty care (PCC), supervised by SP officers, can be implemented at the Role 1 level to meet the scale required for LSCO and provide a team-based approach to more complex casualty care. However, note that there has been limited development in a team-based approach to combat casualty care in this area thus far, and battalion aid stations are not currently staff-organized to implement the PCC concept.

A highly prioritized capability gap of the Army medicine in the LSCO environment is the scaling and synchronization of casualty care in prolonged evacuation scenarios, doctrinally



Figure 2. Tactical evacuation training. As part of the training, soldiers loaded casualties into a UH-60 Blackhawk helicopter simulating real-world patient evacuation. Photograph by SPC Nataja Ford, US Army Reserve. Reproduced from DVIDS. <https://www.dvidshub.net/image/7986947/804th-casualty-evacuation-training>.



Figure 3. Tactical Combat Casualty Care nighttime operations. Photograph by PFC Steven Young, US Army. Reproduced from DVIDS. <https://www.dvidshub.net/image/804859/nighttime-emergency-medical-evacuation-training>.

labeled prolonged care. The prolonged care augmentation detachment (PCAD) is a new concept to develop a team-based approach to address the PCC gap identified in future LSCO environments. The PCAD team includes a physician assistant, critical care/emergency medicine nurse, licensed practical nurse, and combat medic. The team will have the ability to augment organic Role 1 aid stations that require critical care transport, critical care patient hold, and prolonged care requirements, enabling combatant commanders to maneuver in complex and constrained environments. The PCAD team will require additional trauma critical care training and advanced logistics to provide medical care at scale for the predicted delayed evacuation scenarios (Figure 3). Synchronizing assistance from adjacent SP specialties will minimize the effects of brain injury and maximize behavioral health triage, nutrition, and effective RTD operations.

Finally, maximizing the starting strength of forces throughout the implementation of the H2F program enhances performance and resilience during sustained combat engagements. SP officers are dedicated to supporting combat arms soldiers, and they are already prepared, albeit with operational limitations, to minimize battle and nonbattle injuries.

Rehabilitation and Survivability

SP providers work as a team to provide comprehensive care and rehabilitation to injured service members during LSCO. These highly skilled professionals are vital in optimizing the survivability, recovery, and functional outcomes of wounded personnel, both physically and mentally.

Currently, the training opportunities available to address the specialized field of acute and critical care rehabilitation are limited. One method of obtaining such training is at the Burn Institute of Surgical Research in San Antonio, TX (Figure 4). The Management of Burn and Multiple Trauma course is offered annually to approximately 40 service members across several medical specialties. However, the rate of these training opportunities cannot keep pace with the training requirements needed to close the capability gap. This lack of training opportunities poses a challenge, considering that such a skill set will be crucial for physical and occupational therapists within the SP Corps during LSCO.

In the context of LSCO, the demand for skilled rehabilitation professionals becomes even more critical. These operations often result in a substantial number of casualties with severe injuries and wounds, including limb amputations, traumatic brain injuries, and other complex medical conditions. The role of SP Corps providers becomes indispensable in helping wounded service members survive and regain functionality. At the present time, traditional rehabilitation training programs often focus on general rehabilitation practices or outpatient care settings, neglecting the unique challenges and demands of acute and critical care settings. Addressing specialized training gaps may help prepare physical

therapists to tackle the complex and time-sensitive patients' needs in high-intensity combat environments (Figure 5). By addressing these capability gaps, the SP Corps will enhance the quality of care and deliver essential expertise and medical support when evacuation is delayed.



Figure 4. Upper extremity casting. Occupational therapists MAJ Bryan Yu and CPT Talia Barrow participate in a hands-on cast application training with the SP Corps as part of the Management of Burn and Multiple Trauma Course. Photograph by MAJ Dominique Scutella.



Figure 5. Autologous blood transfusion. CPT Elisa Barboza (65B) participates in autologous blood transfusion training, led by CPT John Maitha (65D) as part of the Combat Medic Specialist Training Program. Photograph by MAJ Dominique Scutella.

Nutrition Care and Survivability

Rethinking patient feeding and nutrition support is vital for the survivability of casualties during LSCO. In past conflicts, such as Operation Iraqi Freedom and Operation Enduring Freedom, the United States quickly achieved airspace superiority, enabling rapid evacuation of casualties out of the theater

of operations and to a level 5 facility in the strategic rear area within 2 to 3 days from the point of injury.^{17,18} These timelines left little time for dietitians to evaluate casualties and even less time to initiate nutrition support before moving casualties to higher levels of care.¹⁷

With the increasing probability of prolonged patient management at each role of care, early enteral nutrition or the delivery of nutrients beyond the esophagus via a tube, ideally within 4 to 6 hours of injury, must be prioritized.¹⁹ Early enteral nutrition has been associated with improved patient outcomes, such as increased macronutrient delivery, decreased mortality, decreased rates of infection, and shorter hospital length of stay.^{20,21} Further, there is evidence that for every hour delay in the initiation of enteral nutrition, particularly in critically burned casualties, the odds of mortality rise by 2%, a significant issue considering the extended casualty holding and evacuation times during LSCO.²² Army dietitians will need the skill set and ingenuity to optimize enteral nutrition provisions in potentially resource-limited environments. Transport and storage of enteral products may be severely constrained due to the operational environment, limiting dietitians to what is available through rations or on the local economy to create improvised tube feedings.²³

Presently, there is a lack of training opportunities for the intricacies of potential LSCO casualties. The Army began offering a burn and trauma fellowship at the Institute of Surgical Research in 2020; however, this fellowship is only offered to one active-duty Army dietitian biennially, limiting the SP Corps' capacity to effectively support the management of complex patient feeding in a combat environment. The Joint Field Nutrition Operations Course, available annually to only 45 active-duty and reserve officers and enlisted service members from all uniformed services, provides an overview of medical field feeding using operational rations and supplements. It also covers detainee and humanitarian operations, but it does not fully prepare dietitians for the rigors of managing the nutrition support of critically ill casualties over prolonged field care expected in LSCO. The Joint Advanced Nutrition and Dietetics Symposium (JANDS) is a 13-week distance learning course designed to improve the readiness of military dietitians for the operational rigors of garrison and deployed environments. However, JANDS does not include an adequate curriculum addressing the nutrition support for trauma and burns to prepare deployable dietitians for the complex patient population expected in LSCO. More limitations to this course include the lack of hands-on training or the experience and knowledge gained through resident training.

Offering annual burn and trauma fellowships at more facilities or annually producing one to two trained 65Cs will increase the inventory of dietitians with the skills and

expertise to manage complex patients in austere environments. Further, leveraging these subject matter experts to teach annually at the Joint Field Nutrition Operations Course through JANDS or create a nutrition support guide tailored to the unique requirements and resource limitations inherent in LSCO could be one way to address the present capability gap.

As the battlefield changes and routinely delaying evacuation 48 to 72 hours continues, the 65D's role in feeding tube placement and enteral feeding initiation is worth considering, especially in the early roles of care where a 65C may not be available for nutrition support guidance. While recognizing the inherent risk with blind feeding tube insertion at Role 1 because of the lack of resources to validate accurate tube placement, clinical judgment must also weigh the consequences of delaying enteral feeds in specific patient populations. Consider, for example, a casualty with $\geq 20\%$ total body surface area burns. That casualty's odds of mortality increase by 2% each hour enteral nutrition is delayed, increasing the odds of mortality by 48% for every 24 hours the casualty remains at Role 1 awaiting evacuation while not being fed. Presently, there is no specific training or guidance provided to 65Ds on this skill set, particularly in the austere environment, which leaves the 65D no option other than not to feed. Further thought and consideration as to leveraging the 65D's skills in feeding tube placement and initiation of low rates of enteral nutrition at earlier roles of care is required, and ultimately, clinical judgment must be used based on the risk-benefit analysis of each situation. The 65D's role in nutrition support further demonstrates the interoperability of the SP Corps and its role in improving survivability during LSCO.

Maximizing Return to Duty

SP officers deploy with their units, which enables the sustainment of soldier readiness in combat environments. Such enhanced physical and mental performance and recovery capability while in theater is integral to sustaining combat power to accomplish the mission. From 2001 to 2013, nonbattle injuries accounted for over one-third of medical evacuations from Iraq and Afghanistan, and the top two reasons for these injuries were sports, personal physical training, and falls or jumps.²⁴ This pattern of MSKI in deployed settings is consistent with what is typical in garrison, and similar rates of disease and nonbattle injuries seen in counterinsurgency environments may occur in LSCO. In 2022, a study examining retrospective soldiers data in garrison environments showed that the most common activities associated with lost duty days due to MSKI were running, followed by falls, slips and trips, physical training, and ruck or road marching.²⁵ The presence and engagement of SP officers and H2F teams in theater will assist in mitigating these injuries and will enable the preservation of evacuation assets to support combat operations. Recognizing the realities of contested

airspace and logistics during LSCO, H2F assets are even more integral to maintaining soldier readiness within the unit footprint.

Historically, Army occupational therapists assist combat operational stress control (COSC) units in deployed settings. The mission of COSC units in theater is to conserve fighting strength as it relates to behavioral health and the speedy return of soldiers to duty. A COSC unit concentrates on resilience, therapy, medical management of psychiatric conditions, and medical evacuation as necessary. A COSC unit consists of 44 personnel, of which 12 are credentialed providers, including psychiatrists, psychologists, clinical social workers, occupational therapists, and psychiatric nurse practitioners. Additionally, 20 unlicensed enlisted personnel are assigned, including behavioral and occupational therapy specialists, unit ministry chaplains, and the remainder of the roster is the command team. Adverse combat operational stress behaviors account for 50% of all battlefield casualties, depending on conditions. In addressing combat and operational stress reactions (COSRs), COSC units demonstrated a 95% RTD rate.²⁶ In recent years, the reduction in forward behavioral health support has resulted in a significant increase in psychiatric evacuations, comprising 24% of medical evacuations in 2017 and 28% in 2018.²⁷ These statistics highlight the ongoing and essential need for behavioral health support in deployed settings. The new model for triage may result in significant morale injury that will require early prevention and intervention for units suffering extensive loss during a campaign. With the projected substantial loss during LSCO, COSC units can anticipate high workload volumes to support reconstitution efforts, as seen in a recent Center for Army Lessons Learned article demonstrating a 600% workload increase during the withdrawal from Afghanistan in 2021.²⁸

The current model for delivering behavioral healthcare in deployment settings has potential weaknesses. Restoration centers are located near a unit's medical treatment facility for short stays (1–3 days) to reassure normality, rest, replenish needs, restore confidence, and RTD. While these centers have demonstrated high effectiveness, they lack mobility. The projected constrained and compromised network capabilities during LSCO reduce the potential utilization of telehealth, increasing the need for battlefield circulation of these assets to sustain combat power. Historical examples demonstrate the negative impact of lacking forward behavioral health support, with high rates of psychiatric casualties and reduced mission readiness. Evacuating all personnel with COSRs for long-term rehabilitation may lead to unsustainable losses, as many do not return to the theater.

Expansive and highly mobile forward treatment options are crucial for effectively addressing COSRs in future conflicts.

A recent course, Management of Combat Operational Stress Reactions, aims to address the capability gap for training 65As to tackle problem sets for managing COSRs in a deployed setting. However, this course is only offered annually, is not embedded into the COSC course, and is not in the ICTL for 65As. Occupational therapists have a unique opportunity in the H2F model to expand unit training to the leadership in the early identification and mobile management of COSRs to develop top down-support, reduce stigma related to seeking care, and generate force multipliers in the early identification and management of these conditions prevent catastrophic combat power loss.²⁹

In previous conflicts, COSC units managed mild traumatic brain injuries (mTBI). These units have occupational therapists with specific education and training in this area who are responsible for the rehabilitation of individuals with mTBI in theater.³⁰ However, during LSCO, characterized by a more chaotic and resource-constrained environment, managing mTBI cases becomes even more challenging. In LSCO, COSC units will be vital in reducing behavioral health losses; therefore, the identification and management of mTBI would be better aligned under the H2F assets to support effective RTD for soldiers exposed to this injury. Due to limited resources and the prioritization of life, limb, and eyesight conditions in deployed settings, individuals with mTBI often go underdiagnosed or undertreated. In the context of LSCO, rehabilitative services become crucial within the H2F model. Developing and expanding H2F teams augment the potential for multidisciplinary care via these resourced teams to screen for mTBI and provide proper treatment at the right time. Both physical therapists and occupational therapists can provide specialized training and support to other organic medical assets in effectively caring for individuals who have experienced multiple traumas, including the likelihood of secondary conditions such as mTBI, in an environment that requires prolonged care. The H2F model aims to mobilize and train support personnel to deliver comprehensive care that addresses the complexity of casualties in the future battlespace. Physical and mental readiness teams within the H2F model may have greater capacity and resources available for managing polytrauma, including mTBI casualties, which will be imperative in sustaining high levels of combat power and effectiveness.

MOVING TOWARDS GREATER INTEROPERABILITY: TACKLING THE SURVIVABILITY SLUMP

To address the projected gaps identified in this article, the SP Corps is prioritizing increased interoperability of its areas of concentration (AOC) within core competencies and ICTLs relevant to enhancing survivability within the battlespace. The deficiencies in the ability to support survivability can be visualized as the survivability slump

(Figure 6). This concept demonstrates the current capability within each of the essential items in the SP Corps portfolio: readiness, survivability, and RTD. Generally, each medical professional in the SP Corps contributes equally to the readiness and RTD through prevention, evaluation, and treatment. However, there is a significant gap in the capability of 65As, 65Bs, and 65Cs to support survivability, reducing the ability to provide medical sustainment to the combatant commander.

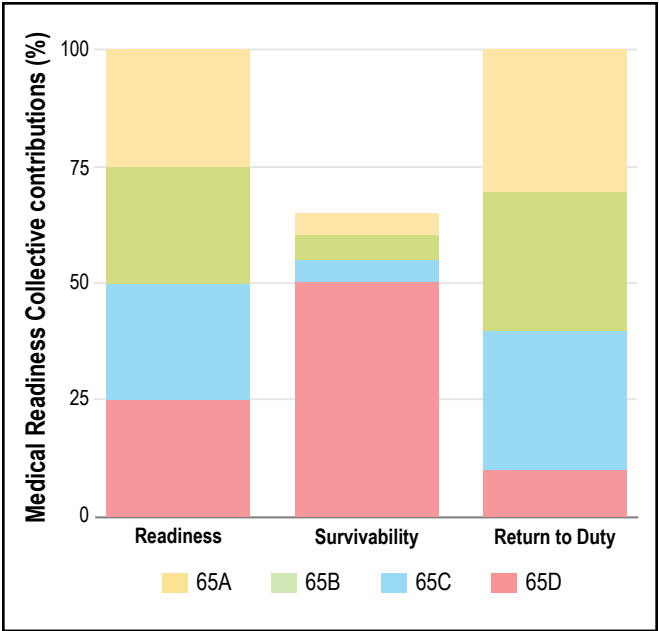
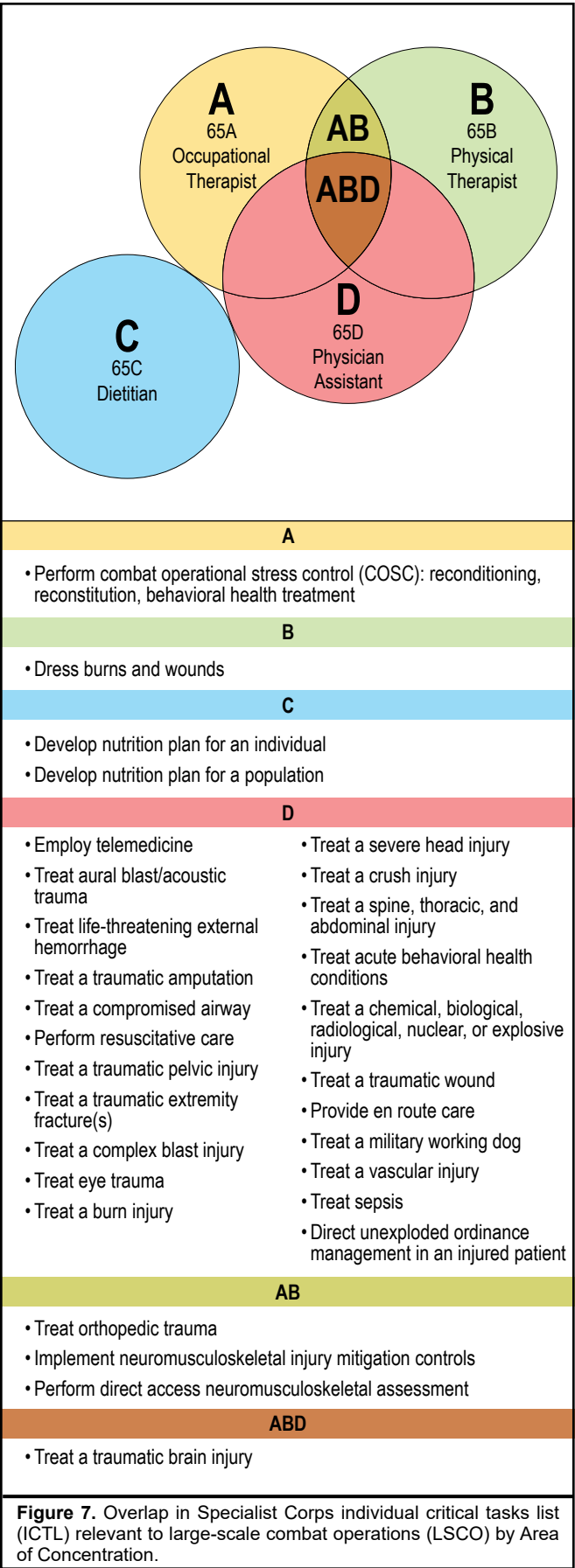
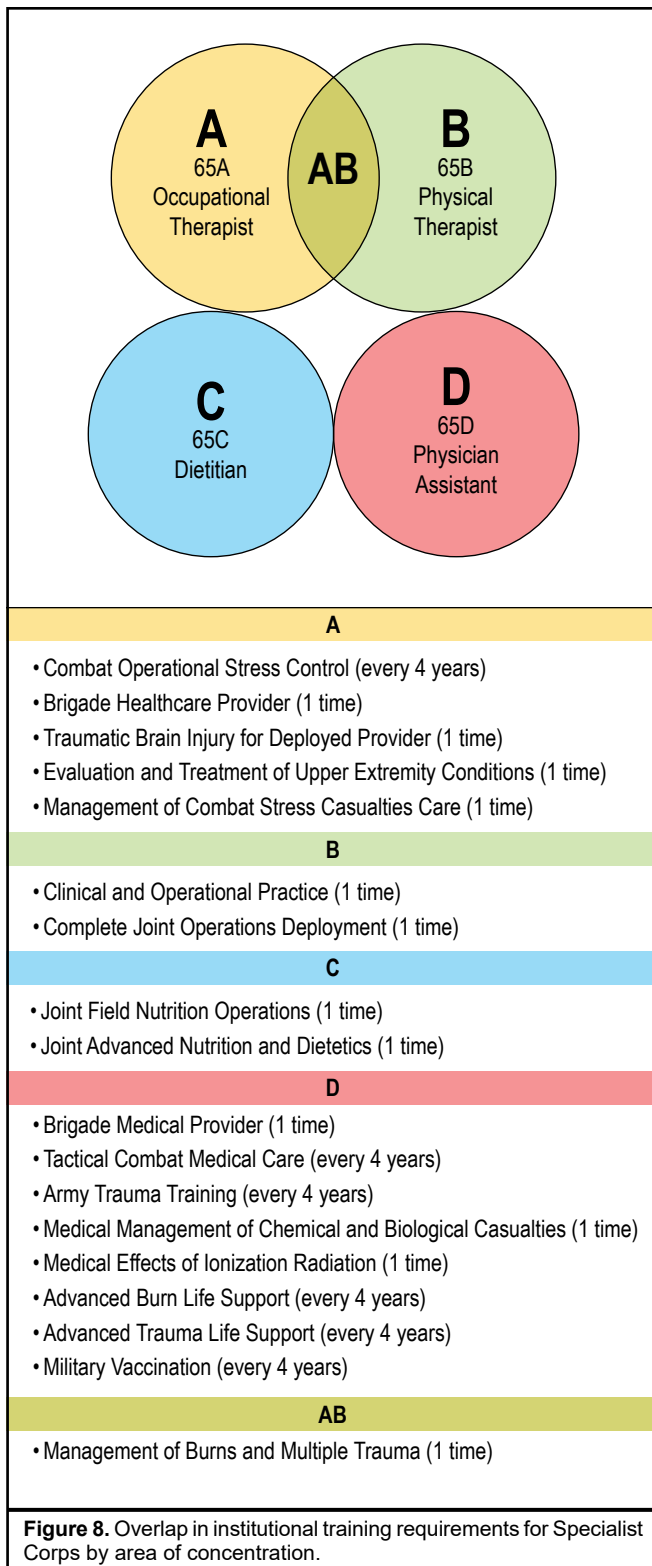


Figure 6. The survivability slump.

Currently, there is little overlap in critical LSCO-relevant skills, such as treating a life-threatening external hemorrhage, traumatic wounds, a compromised airway, and employing telemedicine (Figure 7, shaded area D). Figure 7 also shows some overlap in other skills between physician assistants (65D), physical therapists (65B), and occupational therapists (65A), such as treating a traumatic brain injury (ABD), orthopedic trauma (AB), and other orthopedic injuries (D); however, the dietitian (65C) ICTLs do not overlap with any other AOC. The ICTLs, most recently published in 2022, also contain institutional training requirements in the form of annual or quadrennial courses. Out of the 19 trainings mandated for the SP Corps, only one course, the Management of Burns and Multiple Trauma course, spans more than one AOC (Figure 8, shaded area AB). Given competing requirements for clinical care, personal medical readiness, additional readiness requirements, and the available throughput of these courses, the maintenance of these certifications to reach critical mass across each AOC, as published, is unlikely. A detailed review of the capability output of each course is recommended to prioritize training requirements, followed by concomitant investment in cadre and facilities to execute the courses to scale.





Expanding the overlap of ICTLs of all SP officers in the critical skills to support triage and treatment efforts will improve redundancies in life-saving capabilities by reducing commander's risk and enhancing survivability and RTD. This approach will allow for a more ready, relevant, and

responsive medical force to support the combatant commander in varying battlefield conditions across the continuum of care. Preparing SP Corps officers to provide medical augmentation to support survivability must consider a well-defined, robust analysis of the capability gaps in the current ICTLs and the development of a comprehensive and achievable training plan. Physician assistants have extensive training and education in maximizing survivability; however, the remaining specialties within the SP Corps do not historically engage in these aspects of care, instead focusing on physical and nonphysical domains of readiness and RTD in the garrison. Meeting the medical demands of LSCO will involve an increased need for cross-training, synchronization, and flexibility in the SP Corps to support improved survivability, allowing for continued rehabilitation and RTD.

This timely and necessary adaptation within the SP Corps will reduce the survivability slump, ensuring the sustainment of combat power during LSCO in a continually evolving operational environment. Through the enhancement of survivability supporting prolonged field care, in addition to the premier skillset in building readiness and maximizing RTD rates, the SP Corps will be better prepared to meet the projected demands of future conflicts. The path ahead is challenging, but the lessons from the past, coupled with a steadfast commitment to innovation and adaptability, pave the way for a ready medical force equipped and postured for the complexities, resource constraints, and operational requirements of LSCO.

References

1. US Department of the Army. *Sustainment Operations*. DA; July 2019: Chap 5. Field Manual 4-0.
2. Lovalekar M, Hauret K, Roy T, et al. Musculoskeletal injuries in military personnel—Descriptive epidemiology, risk factor identification, and prevention. *J Sci Med Sport*. 2021;24(10):963-969.
3. Molloy JM, Pendergrass TL, Lee IE, Chervak MC, Hauret KG, Rhon DI. Musculoskeletal injuries and United States Army readiness, Part I: Overview of injuries and their strategic impact. *Mil Med*. 2020;185(9-10):e1461-e1471.
4. US Department of the Army. *Holistic Health and Fitness*. DA; October 2020: Chap Field Manual 7-22.
5. US Department of the Army. *Holistic Health and Fitness*. DA; 2023. Center for Army Lessons Learned (CALL) Publication 23-06(784).
6. US Department of the Army. *Survivability of Army Personnel and Materiel*. DA; 2019. Army Regulation 70-75.
7. US Department of the Army. *Theater Hospitalization*. DA; 2020. ATP 4-02.10.
8. Howard JT, Kotwal RS, Stern CA, et al. Use of combat casualty care data to assess the US military trauma system during the Afghanistan and Iraq conflicts, 2001-2017. *JAMA Surg*. 2019;154(7):600-608.
9. Dupuy TN, Brinkerhoff JR, Johnson C, Clark PJ. *Handbook of Ground Forces Attrition in Modern Warfare*. Historical Evaluation and Research Organization (HERO), Data Memory Systems Inc. Publication AD-A278-728. Accessed January 8, 2024. <https://apps.dtic.mil/sti/pdfs/ADA278728.pdf>
10. Jensen G, van Egmond T, Örtengwall P, Peralta R, Aboutanos MB, Galante J. Military civilian partnerships: International proposals for bridging the Walker Dip. *J Trauma Acute Care Surg*. 2020;89(2S Suppl 2):S4-S7.

11. Barbee, G. A. *The Strategic Survivability Triad, The Future of Military Medicine in Support of Combat Power*. Joint Forces Quarterly; 2022. JFQ Issue 107:102-115.
12. Eastridge B, Mabry R, Seguin P, et al. Death on the battlefield (2001Y2011): Implications for the future of combat casualty care. *J Trauma Acute Care Surg*. 2012;73(6 Suppl 5):S431-7.
13. Shackelford SA, Remley MA, Keenan S, et al. Evidence-based principles of time, triage, and treatment: Refining the initial medical response to massive casualty incidents. *J Trauma Acute Care Surg*. 2022;93(2S):S160-S164.
14. Shackelford SA, Del Junco DJ, Powell-Dunford N, et al. Association of prehospital blood product transfusion during medical evacuation of combat casualties in Afghanistan with acute and 30-day survival. *Jama*. 2017;318(16):1581-1591.
15. Kotwal RS, Howard JT, Orman JA, et al. The effect of a golden hour policy on the morbidity and mortality of combat casualties. *JAMA Surg*. 2016;151(1):15-24.
16. Schauer SG, April MD, Knight RM, et al. The risks of prolonged casualty care for conventional forces in large-scale combat operations. Task and Purpose. May 9, 2023. Accessed December 12, 2023. <https://taskandpurpose.com/opinion/risks-prolonged-casualty-care-large-scale-combat-operations/>
17. Stankorb SM, Salgueiro M, Grediagin A. Enteral feeding practices for U.S. service members in a deployed combat support hospital. *Mil Med*. 2009;174(7):685-688.
18. Stankorb SM, Ramsey C, Clark H, Osgood T. Provision of nutrition support therapies in the recent Iraq and Afghanistan conflicts. *Nutr Clin Pract*. 2014;29(5):605-611.
19. McClave SA, Taylor BE, Martindale RG, et al. Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *J Parenter Enteral Nutr*. 2016;40(2):159-211.
20. Li PF, Wang YL, Fang YL, Nan L, Zhou J, Zhang D. Effect of early enteral nutrition on outcomes of trauma patients requiring intensive care. *Chin J Traumatol*. 2020;23(3):163-167.
21. Yeh DD, Cropano C, Quraishi SA, et al. Implementation of an aggressive enteral nutrition protocol and the effect on clinical outcomes. *Nutr Clin Pract*. 2017;32(2):175-181.
22. Shields B, Dispense F, Lee D, Cancio L. Enteral nutrition initiation achievement and mortality in mechanically ventilated patients with severe burns. *J Parenter Enteral Nutr*. 2023; 47(2):S5-S58.
23. Frizzi JD, Ray PD, Raff JB. Enteral nutrition by a forward surgical team in Afghanistan: *South Med J*. 2005;98(3):273-278.
24. Patel AA, Hauret KG, Taylor BJ, Jones BH. Non-battle injuries among U.S. Army soldiers deployed to Afghanistan and Iraq, 2001–2013. *J Safety Res*. 2017;60:29-34.
25. Roy TC, Faller TN, Richardson MD, Taylor KM. Characterization of limited duty neuromusculoskeletal injuries and return to duty times in the U.S. Army during 2017-2018. *Mil Med*. 2022;187(3-4):e368-e376.
26. Brusher, EA. Combat and Operational Stress Control. In: Brusher, EA, *Combat and Operational Behavioral Health, Textbook of Military Medicine*. Borden Institute;2011:Chap 4.
27. Hoyt T, Hein C. *Combat and Operational Stress Control in the Prolonged Field Care Environment*. Military Review; September-October 2021.
28. Ponder K, Baker J, Haus D. Lessons from a combat operational stress control unit. *Center for Army Lessons Learned (CALL)*. January 31, 2023. Accessed October 16, 2023. <https://api.army.mil/e2/c/downloads/2023/01/31/cfd828e1/22-679-lessons-from-a-combat-operational-stress-control-unit-public.pdf>
29. Smith-Forbes E, Najera C, Hawkins D. Combat operational stress control in Iraq and Afghanistan: Army occupational therapy. *Mil Med*. 2014;179(3):279-284.
30. US Department of the Army. *Casualty Care: Mild Traumatic Brain Injury/ Concussion*. DA; 2013. ATP 4-02.5.

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