CASUALTY

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Commander's Corner

SAVING LIVES IN THE FIELD ARMY IMPROVES PRE-HOSPITAL CARE

RDML Brian S. Pecha

The Medical Officer of the Marine Corps Headquarters USMC, Health Services Arlington, VA





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Bridging the Survival Gap

San Antonio Medical Center's **Emergency Medical and** Disaster Medicine Fellowship program is addressing the need to reduce "pre-hospital care" time post trauma.

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Leatures

RDML Brian

S. Pecha

The Medical Officer of the Marine Corps HQ USMC, **Health Services** Arlington, VA



Targeted Amplification

Update on the recently approved Noise Immune Stethoscope.

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Burn Care Forward

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6th Med Group

The USAF 6th Medical Group is a key provider of combat casualty care in theater and post transport.

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over: Soldiers from the 528th Sustainment Brigade (Airborne) unload a simulated casualty from a UH-60 Blackhawk during a MEDEVAC field training exercise on Fort Bragg, N.C



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Mailing Address

Tactical Defense Media, Inc.
Leisure World Plaza
PO Box 12115
Silver Spring, MD 20908-0115 USA
Telephone: (301) 605-7564
Fax: (443) 637-3714
www.tacticaldefensemedia.com
circulation@tacticaldefensemedia.com
editorial@tacticaldefensemedia.com
advertising@tacticaldefensemedia.com

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Insights

ith all the talk of "change" in the military over the past few years—whether due to drawdowns or budgets—the word risks becoming a bromide without evidence to support it. In the 2014 issues of Combat & Casualty Care (C&CC), we will try to provide that evidence: C&CC will highlight programs and people that have attempted to transform the technology, methods, and education of combat medicine professionals based on lessons learned from war. In this issue, these individuals include generals, officers, and private companies; each have a different perspective, and each will make major contributions to improving battlefield care.

From U.S. Army San Antonio Medical Center, TX, readers get a look through the eyes of a former Special Forces medic at why and how he organized a Battlefield Response and Disaster Medicine Fellowship program, addressing the need for the implementation of rapid first response techniques so often used in civilian settings to save lives in the balance, but which remain too absent at the side of our critically-wounded war heroes.

Amidst the harsh realities of combat casualty response, we also summarize some of the technologies that are enabling more effective "golden hour" treatments, such as the new Army first aid kit. Moving beyond the initial stages of injury, articles will show the greater focus across the DoD medical community on casualty care that goes beyond mere short-term, "Band-Aid level" solutions, looking at ways to better manage immediate care more holistically so that patients have the best chance of survival and quality of life well after physical wounds heal.

In an exclusive interview, RDML Brian Pecha, The Medical Officer of the Marine Corps, speaks to C&CC about the challenges his department faces in addressing the unique medical needs of a globally-deployed, multi-purpose force. From force-ready care to ongoing R&D forming the basis for the critical technologies of tomorrow so often needed today, our discussion sheds some light on USMC health programs, partnership with civilian educational institutions, and how the Corps' medical operations might change after Afghanistan.

To round out this issue, we offer readers a profile of 6th Medical Group, MacDill AFB, Tampa, FL, supporting the combat capabilities of the 6th Air Mobility Wing, U.S. Central Command, U.S. Special Operations Command, and 36 other diverse mission partners, by providing administrative, logistics, and ancillary medical support to 220,000 beneficiaries in the DoD's largest single catchment area. They're likely to stay busy regardless of drawdowns.

As always, feel free to contact me with questions, comments!

Sincerely,

Kevin Hunter

Editor

Combat & Casualty Care

contact@tacticaldefensemedia.com

Christian Sheehy Managing Editor Tactical Defense Media

christian@tacticaldefensemedia.com

Assistant Editor
George S. Jagels
george@tacticaldefensemedia.com

Sonia Bagherian Publisher Tactical Defense Media

soniab@tacticaldefensemedia.com

Shean Phelps
Contributing Editor
Combat & Casualty Care

contact @ tactical defense media.com

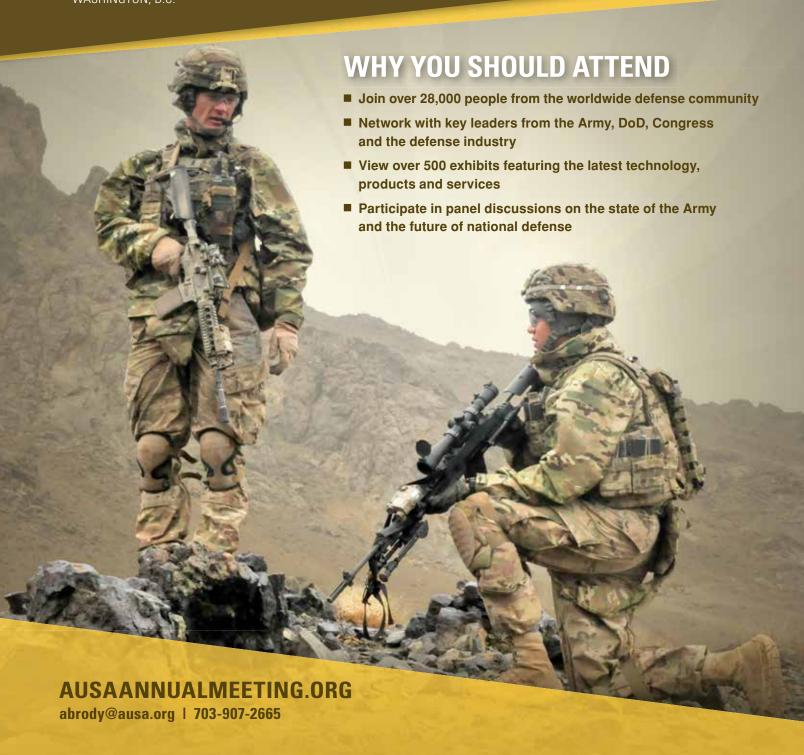


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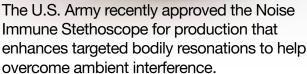
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Targeted Amplification





By Mrs. Catherine Davis, Public Affairs Specialist, U.S. Army Aeromedical Research Laboratory

n collaboration with Active Signal Technologies, a Small Business Innovation Research partner, the U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL, and U.S. Army Medical Research and Materiel Command, Fort Detrick, MD, developed a medical device that can be used to listen to heart and lung sounds in high-noise environments such as medical evacuation vehicles.

"Heart and lung sounds are a necessary component of casualty triage and ongoing care. Hearing and assessing these sounds with traditional acoustic stethoscopes is very difficult on the battlefield. It is vitally important that military medical care providers have the necessary tools while managing patients." said Maj. Tim Cho, USAARL Aeromedical Factors Branch Chief.

Automated Listener

The Noise Immune Stethoscope (NIS), like a standard acoustic stethoscope, uses an acoustic listening mode, and also adds ultrasound-based technology that is "noise immune" to amplify heart



and lung sounds. This technology has the capability for users to easily switch from Doppler to acoustic mode. Both modes immediately turn body sounds into electrical signals for enhanced performance. The Communications Earplug, currently being used by aviators, attaches to the NIS and allows auscultation while wearing the flight helmet.

"The dual-mode stethoscope is specifically designed for high noise conditions," said Cho. "As a result, the fight surgeon or flight medic will be able to make more accurate decisions while en route to higher echelons of care during flight."

The NIS enables medical personnel to assess abnormalities of the cardiopulmonary system in high-noise environments like the transportation of wounded soldiers in medical evacuation aircraft, ground warfare, and intensive care units.

Moving Forward

Between 2007 and 2013, the NIS received U.S. Food and Drug Administration 510(k) clearance, and through a series of rigorous laboratory and field tests conducted by USAARL, the NIS received an airworthiness release for use on-board the Black Hawk helicopter. The device is now approved for full-rate production for use in real-world operational environments.

More info: www.usaarl.army.mil

Moving Burn Care Forward

The U.S. Army Institute of Surgical Research Burn Center is providing state-of-the-art predeployment training to Forward Surgical Teams.

By Steven Galvan, USAISR Public Affairs Officer

highly skilled group of critical care providers tasked with providing combat wounded medical attention within a war zone during the first hour following a traumatic event, Forward Surgical Teams (FSTs) are key responders during the "golden hour" of injury. Deployed to support Overseas Contingency Operations, FSTs are composed of 20 critical care team members who train for months prior to deploying to ensure a cohesive and effective team to care for wounded warriors and prepare them for the next level of medical attention.

Proactive Approach

The 126th FST from Fort Hood, TX, is preparing for a deployment in 2014 and are honing their critical care skills with a five-day pre-deployment training at the U.S. Army Institute of Surgical Research (USAISR) Burn Center, the sole facility caring for combat burn casualties within the Department of Defense. Since March 2003, the Burn Center at Joint Base San Antonio-Fort Sam Houston, TX, has cared for more than 1,200 wounded warriors who sustained severe burns and/or associated injuries, most directly in support of Operations Iraqi and Enduring Freedom. Burn care treatment is a specialized and complex skill set that requires months of hands-on training that the majority of FST nurses and medics do not possess. The training at the Burn Center provides realistic scenarios that



Major Scott A. Phillips, left, the U.S. Army Institute of Surgical Research (USAISR) Burn Center Senior Critical Care Nurse Specialist and Chief of the USAISR Clinical Education Department, demonstrates how to use the Burn Navigator to assist with resuscitating burn patients to Major (P) Jodelle Schroeder during pre-deployment training. (USAISR)

prepares the FST to treat and care for burn casualties until they are transferred to the next level of care and ultimately to the Burn Center.

Major Scott A. Phillips, Burn Center Senior Critical Care Nurse Specialist and Chief of the USAISR Clinical Education Department, helped design the training to expose the FST on crucial care for combat wounded burn casualties. "Everything we do is to benefit soldiers on the battlefield," said Phillips. "Our job is to get [FSTs] trained on burn care since they provide critical medical treatment as forward as possible in a war zone."

Phillips, who has firsthand experience in a deployed war zone setting, set as a goal designing realistic hands-on training. "Burn patients have to be properly resuscitated within the first 72 hours of injury," he said. "Too much or too [few] fluids can be fatal. Our goal is to train FSTs who do not have much experience with working on burn casualties on how to properly resuscitate them."

Intuitive Training

One of the tools used to accomplish proper resuscitation is the incorporation of the Burn Navigator in the training. The Burn Navigator (Burn Resuscitation Decision Support System) is designed to assist non-burn care providers with recommendations on how to properly resuscitate a burn casualty and assist in avoiding problems related to over- or under-resuscitating by medical care providers who do not routinely care for such patients.

The 126th FST Chief and Critical Care Nurse Specialist, Major (P) Jodelle Schroeder, said that the exposure to burn care training is important for her team. "It serves two purposes," she noted. "First, it gives us an opportunity to work together as a team for a quick evaluation of treatment, and it exposes us to burn patients so that we will know how to care for a burn patient."

More info: usaisr.army.mil



The U.S. Army is now issuing soldiers a more robust, streamlined Individual First Aid Kit II that addresses eye injury, among standard wound care.

By C. Todd Lopez, Army Staff Writer, in coordination with DoD Vision Center of Excellence

he Individual First Aid Kit II (IFAK II) contains all the supplies of the old kit, with the addition of a second tourniquet, a tactical combat casualty card to annotate what kind of first aid was applied to a wounded soldier, a marker, an eye shield, a rubber seal with a valve for sucking chest wounds, and a strap cutter. The kit fits inside a custom pouch that can be mounted out-of-the-way on the back of a soldier's Improved Outer Tactical Vest.

"That's typically low-rent real estate there," said Major Peter Stambersky, assistant product manager of soldier clothing and individual equipment at Program Executive Office Soldier, Fort Belvoir, VA. "Guys don't use it too much."

Pouch Parceled

The pouch has "US IFAK" printed on its rear, so soldiers may easily identify its contents, Stambersky said. The individual tourniquet pouches also contain customizable removable tabs that allow soldiers to hand write their blood type or unit on the kit.While the new first aid kit can be mounted on a soldier's back, it is designed to be easily accessible when needed for both right-handed and left-handed soldiers.

The IFAK II can be removed from its container pouch from either side by

pulling on one of two tabs and slipping it out of its case. The tabs also have small "flaps" on them, so that when a soldier is reaching for the kit, he can get some tactile feedback that lets him know he is pulling on the right tab, Stambersky noted. When removed, the foldable kit remains attached to the pouch by an elastic tether.

The kit also comes with two removable tourniquet pouches that can be mounted to the kit or to other parts of a soldier's gear. Stambersky said soldiers might even remove one of the tourniquets from its separate pouch and store it in a cargo pocket on their uniform pants or in a sleeve pocket.

"You can take this out and walk around with them in your pocket, which a lot of guys are doing in-country now," he said, while waving the un-pouched tourniquet in the air.



Opposite page and above: The Army is now issuing to soldiers the more robust, more streamlined "Individual First Aid Kit II" as replacement for the older kit, which was built inside an ammunition pouch for a Squad Automatic Weapon. (C. Todd Lopez)

Fully Afield

The kit is already in Afghanistan in small numbers, as part of a previously initiated limited user evaluation involving 4th Brigade, 3rd Infantry Division, out of Fort Polk, LA. In September, units at Fort Bragg, N.C., received the kits through the Rapid Fielding Initiative in advance of their own deployment.

Stambersky said the Army added the Tactical Combat Casualty Care card and a small Sharpie marker to the kit as a way for soldiers who have administered first aid to a fellow soldier to indicate to follow-on medical professionals the kind of assistance that was rendered. The card, once marked, is meant to be attached to the uniform of the afflicted soldier. The new method, he said, is better than the old way.

"What you would do if you found me on the battlefield and you applied a tourniquet to me is you would write that on this card and attach this to my body," Stambersky said. "In the old days, the technique was to take blood and write 'T' on your forehead. But that will get smudged with sweat or water; it'll rub off."

Also included in the new kit is a rubber seal that looks much like a stopper to put over a sink drain, but with a valve in it to let out blood. The seal is meant for soldiers who are suffering a sucking chest wound. That happens when a bullet, for instance, has pierced their chest and lung, and as a result of the new hole they are unable to properly draw air into their

lungs. In the past, soldiers might have been directed to bandage a soldier's ID card or other piece of flexible plastic over the wound to cover the hole. The new seal now fills that role.

Pouches inside the IFAK II are left empty so that soldiers may also be issued QuickClot Combat Gauze when they receive their kit. The gauze, due to its shelf life, is not distributed with the kits.

Eye on the Fly

Also in the kit is an eye shield, which is a small, curved aluminum disk with padding on the edges that can be placed over a soldier's wounded eye. The shield is meant to keep pressure off a wounded eyeball when a soldier's injured head is subsequently wrapped with bandages.

"The eye shield is an addition, above and beyond what was in the IFAK II," Stambersky said. "Eye shields are on the battlefield now in the MOLLE (Modular Lightweight Load-carrying Equipment) medic set and in the combat lifesaver bags. But now every soldier has one, to prevent further injury to the eye socket and to the eyeball."

The addition of the eye shield came after the members of the Army ophthalmological community—eye doctors—recognized that something needed to be done in theater to give soldiers who administer first aid to their injured buddies the tools needed to prevent further, perhaps irreparable damage to eyes.

One such doctor is Dr. Robert Mazzoli, an ophthalmologist and retired Army colonel. He now serves as the director of education, training, simulation, and readiness at the Department of Defense's Vision Center of Excellence. Mazzoli said the Army medical community had identified that eye injuries were not being treated with an eye shield, "which is the appropriate immediate treatment." He added that they tracked why that was not happening, and found the eye shield was "not available where the injury was happening."

"When we elevated that as a concern to the [U.S. Army Medical Department] Center and School, the logistics people and the Committee on Tactical Combat Casualty Care, they latched on to that," Mazzoli said.

He added that the eye shields started making their way into various medical kits on the battlefield, and most recently they were included in the IFAK II.

Practice Makes Perfect

While Mazzoli said it's a great move on the part of the Army to include eye protection in first aid kits, he noted it's important too that training on how to use the new equipment is also provided, "We also have to make sure they know."

One of the "good news" stories that has come out of the recent wars in Iraq and Afghanistan is the advancements in medicine and combat care, Mazzoli said. "It shows how we are doing things differently in this war than any previous war that we have fought, in that we are making rapid changes to not just how we are taking care of causalities, but to the stuff we are able to take care of casualties with—like the eye pro, like the tourniquets, and the development of new body armor systems," he said.

Stambersky said the new IFAK II is designed to provide to soldiers only the most basic tools needed to save lives, at the place where injuries occur: "What the IFAK II gets at is life, limb, eye sight, immediate point of injury care—what needs to be done immediately to keep that soldier alive."

More info: vce.health.mil



An Army Special Forces medic turned physician designed a fellowship program to improve the survival chances of battlefield casualties.

By David Vergun, U.S. Army Staff Writer, in coordination with San Antonio Military Medical Center, AMEDD

he aim of the Military Emergency
Medical Services and Disaster
Medicine Fellowship Program is
to train physicians for the "challenges of
pre-hospital care" on the battlefield, in
defense of the homeland, or wherever else
troops may be, according to Lt. Col. (Dr.)
Robert Mabry, the fellowship's program
director, at San Antonio Military
Medical Center.

"Pre-hospital care" is that critical time between a traumatic event and when

care is received at a military treatment facility, or MTF.

Mabry and his colleagues authored a study of service members injured on the battlefield in Iraq and Afghanistan, from 2001 to 2011. The study found that of the 4,596 battlefield fatalities analyzed, 87.3 percent died of their injuries before ever reaching an MTF.

Of those pre-MTF deaths, 75.7 percent were classified as non-survivable, meaning they would have died even had they reached the MTF earlier, and 24.3 percent were deemed potentially survivable. That study, the first of its kind, was published in the Journal of Trauma and Acute Care Surgery in 2012.

No Single Point of Care

Although battlefield medicine has vastly improved during every war since World War II, Mabry said that the 24.3 percent

statistic cited in his study—those who died who might have been salvaged—kept nagging him. "That's where we can make the biggest difference in improving patient outcomes," he said.

What Mabry found is that no one "owns" responsibility for battlefield care delivery, meaning that "no single senior military medical leader, directorate, division, or command is uniquely focused on battlefield care. The diffusion of responsibility is a result of multiple agencies, leaders, and units of the service medical departments each claiming bits and pieces with no single entity responsible for patient outcomes forward of the combat hospitals," he said.

Commanders on the ground do own the assets of battlefield care—medics, battalion physicians, physician assistants, flight medics, and all the equipment—but they are "neither experts in, nor do they

Commanders on the ground do own the assets of battlefield care ... but they are "neither experts in, nor do they have the resources to train, their medical providers for forward medical care."

have the resources to train, their medical providers for forward medical care," he said.

Commanders rely on the medical departments to provide the right personnel, training, equipment, and doctrine, he continued, but the medical departments "defer responsibility to line commanders," Mabry said. "While this division of responsibility may at first glance seem reasonable, the net negative effect of line commanders lacking expertise and medical leaders lacking operational control is analogous to the axiom 'when everyone is responsible, no one is responsible.""

One of the main difficulties in addressing pre-hospital care, Mabry said, is that "we know very little about what care is provided before casualties reach the combat hospital."

Ranger-style Combat Care

Mabry noted that only one military unit—the Army's 75th Ranger Regiment—tracks what happens to every casualty during all phases of care. "Ranger commanders routinely use this data to improve their casualty response systems," Mabry said, adding that the Rangers "are the only U.S. military unit that can demonstrate no potentially preventable deaths in the pre-hospital setting after more than a decade of combat."

While only the 75th Rangers did pre-hospital tracking, once the wounded arrived at a combat support hospital, or CSH, according to Mabry they were met with "robust surgical support and had less than a two percent chance of dying." Those who did die at the CSH generally had a severe head injury or were in profound shock due to the loss of blood when they arrived -- yet some of those deceased had conditions that were "potentially salvageable, had they had some aggressive resuscitation in the field." he added.

But the culture of military medicine is "hospital based," he reiterated, and "no one owns battlefield medicine."

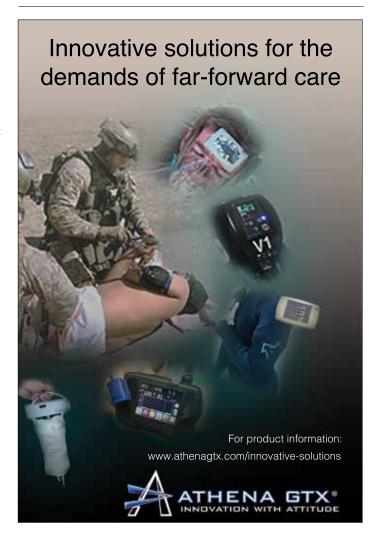
Fast Forward to Today

The hospital-based mentality has its roots in the Cold War. During Vietnam and later, the idea was to "put as many patients as possible in a helicopter and fly them as fast as you can to get them off the battlefield to the field hospital," Mabry said.

After Vietnam, those doctors, nurses and medics returned to the U.S., took off their uniforms and "built our civilian trauma systems," he continued, noting that before Vietnam, EMS, trauma surgery and emergency medicine didn't exist as we know them today. As a result of the war experience, sick or injured civilians in the U.S. today get transported to a trauma center by helicopter, accompanied by a critical-care flight paramedic and a critical-care flight nurse, both of whom are highly trained and very experienced.

"Civilians took the ball, ran with it, and significantly evolved their processes to an advanced standard of care," Mabry said. "But we stayed with our Vietnam model, focusing on speed. So the two models are incredibly different." For Mabry, speed became a problem in Afghanistan. "When I was deployed in 2005, I would have to wait three hours for medevacs sometimes and if it were a host-nation casualty, sometimes even longer," he explained.

And then the level of care in-flight was less than premium. "The medics, through no fault of their own, were still trained at the basic medic level," Mabry said. "At that time, flight medics had no requirement to provide any hands-on care to an actual patient during their training. For many, their first encounter with a seriously injured casualty was during the first flight of their first deployment."





Army Staff Sgt. David Edens, an aerial combat medic assigned to 1st Forward Support Medical Team, wraps a blood pressure monitor around an injured Iraqi soldier's arm during a medical evacuation mission in Iraq on 17 July 2006. (Staff Sgt. Jacob N. Bailey)

Closing the Gap

What Mabry concluded from his studies and field experience was that the solution to the gap in care cannot be addressed with a single-bandage approach. A solution, he claimed, would require "evidence-based improvements in tactical combat casualty care guidelines, data-driven research, remediation of gaps in care, and updated training and equipment." And to supervise those medics, their training and the medevac equipment and procedures, there would need to be a specially trained and qualified physician in charge of that prehospital phase, he said.

Mabry's own experience includes 11 years as an enlisted solider, starting out in the infantry and then becoming a Special Forces medic with a tour in Mogadishu, Somalia, in 1993, during the battle made famous in the book and film "Black Hawk Down." He said those experiences had a profound impact on him and shaped his desire to become an Army doctor, which he did. He later returned to Special Forces as a battalion surgeon and served tours in Afghanistan, in 2005 and 2010.

There Mabry illustrated the power of patient outcome data and how it can drive changes in military medicine—something he hopes to do with his fellowship program. His team tracked down a National Guard medevac unit from California whose members were mostly all critical-care trained paramedics in their day jobs who worked for the California Highway Patrol and other stateside EMS agencies.

They deployed to Afghanistan about four years ago, taking their civilian EMS model with them, he said. "I compared their patient outcomes to the standard medevac outcomes and found a 66 percent reduction in mortality using the civilian medic system," he said. As a result of that outcome, the Army revamped its training of flight medics.

Seeing the Patterns

Another example of how patient outcome data can drive procedural changes is in airway treatment. "If you get an airway injury in the field, you're usually shot in the neck or in the face and have a traumatic disruption of the airway. We did a study showing that when medics perform a cricothyrotomy"—cutting an incision in the neck so patients can breathe—"we found they failed at that procedure about 30 percent of the time," Mabry noted.

"It's a very high-risk, high-stress, yet ultimately life-saving procedure," he continued. "So armed with that data, we went back and figured out a way to make the procedure smoother and simpler." And now medics have a tool that will make them more proficient at doing cricothyrotomies.

"So that's what I'm trying to get at," he said. "Training physician leaders who can look at problems or opportunities for improvements in the field, who have the ability to articulate how to improve systems, give medics better training, better tools, and so [on] to improve patient

outcomes. We want doctors who can look at the data and training and protocols, and use research to solve those battlefield prehospital problems."

Examples of what those physicians might do include understanding the injury patterns for a particular unit and locality, analyzing the trauma transfer system, and seeing where the medics might need more training, Mabry suggested. The physician could also look across the medical research environment and determine which new therapies to incorporate for patient outcome improvements.

The sort of system Mabry said he's describing is similar to what civilian EMS directors do stateside.

Training

This summer, the first fellow will graduate from the two-year curriculum. The first year is the civilian EMS fellowship, accredited by the American Council on Graduate Medical Education and the American Board of Emergency Medicine. "We're one of the first EMS programs in the U.S. to be accredited, so we're excited about that," Mabry said. The program was accredited in October 2012.

During that first year, the docs work at a big-city EMS agency, learning the system of systems of EMS. By system of systems, Mabry refers to the overall EMS system which is composed of other systems (ambulances, helicopters, personnel, training, protocols, trauma destinations, communications, medical equipment, and so on). This understanding enables them to be able to direct a military EMS system, he explained.

The second year is the military portion, which is non-accredited. Each service has its own unique requirements, he said. In the Army, for example, the doc would work with the battalion medical officers at the Tactical Combat Medical Care course, participate in medic training at the combat medic school house, and see how this all works at the strategic level at the Institute of Surgical Research and Joint Trauma System in San Antonio.

Additionally, the fellows will learn about homeland security medical procedures and integrate with local, regional, and national disaster planners, Mabry said. And, they learn about international disaster support—things like

earthquakes and tsunamis that the services might be called upon to support. As if that weren't enough, during this entire twoyear period the fellows are studying for a Masters of Public Health degree in the evenings.

The Masters of Public Health degree "gives [fellows] the ability to use epidemiology, statistics, and a public health model to go in and say 'hey, look, here's the challenge we have in this particular area.' They can then articulate from a policy level how this affects the population or health problem, conduct an analysis and then [know] how to make a case for resources, policy changes, and things like that," he said.

Real World Ready

As for the fellow who graduates this summer, his curriculum looked like this: His first year was with the San Antonio Fire Department EMS. For his second year, he attended the National Park Service Search and Rescue course and did his public health practicum with the Joint Trauma System. He has also worked with the Army Medical Department's Center and School as well as participating in a number of policy and research projects.

Now at Johns Hopkins University attending the Health Emergencies in Large Populations Course, designed primarily for international disaster relief work, he's One of the main difficulties in addressing pre-hospital care, Mabry said, is that "we know very little about what care is provided before casualties reach the combat hospital."

working with some of the world's leading experts in the field. Next, he goes to the flight surgeon course. Upon completion of his fellowship June 30, he's projected to go to Afghanistan for six months to work in the Joint Trauma System as the prehospital director. His follow-on assignment will be in the Army's Critical Care Flight Paramedic Training Program in San Antonio.

Other than Mabry, there are currently three fellows going through their first year: one Air Force and two Army doctors. For next year, Mabry said he hopes to get a Navy doc in the fellowship. (The Navy

currently is not providing the funding for the fellowship.) So the idea is to get three fellows a year, representing each of the services, he said.

Once the physicians complete their fellowships, Mabry said the goal is to get them in positions where their training will make a difference: division surgeons, brigade surgeons, Special Forces group surgeons, directors of trauma systems, and training programs, among others.

While military doctors are already highly trained and motivated, Mabry said he's looking for those who think outside the box, see problems from unique perspectives and perform at all levels: leadership, research, training, problem solving.

Eventually, Mabry hopes to build a cadre who collaborate across the services to "shed light on that battlefield blind spot" of pre-hospital care and change the mindset from hospital-centric care to one that provides state-of-the-art care across the entire chain of survival, starting in the pre-hospital setting at the point of injury.

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Commander's Corner

Optimizing Healthcare for a Maritime Force

RDML Brian S Pecha received his Bachelor's degree in 1983 from the University of San Francisco and a medical degree from Stanford University School of Medicine in 1988. He completed residency training in Internal Medicine at Naval Hospital San Diego, where he served as Chief of Residents.

He entered civilian practice in 1994 and re-affiliated with the Navy Reserve the following year. In 2002, he was recalled to active duty and assigned as senior medical officer for the Branch Medical Clinic at Marine Corps Air Station Yuma. In 2006, he was recalled with 1st Battalion 14th Marines, deploying to Anbar Province in Iraq as the Surgeon for Task Force Military Police, a major subordinate command of the 1st Marine Expeditionary Force. In March 2013 he was brought to active duty as the Force Surgeon for Marine Forces Reserve in New Orleans, and upon promotion in October was recalled again as The Medical Officer of the Marine Corps.

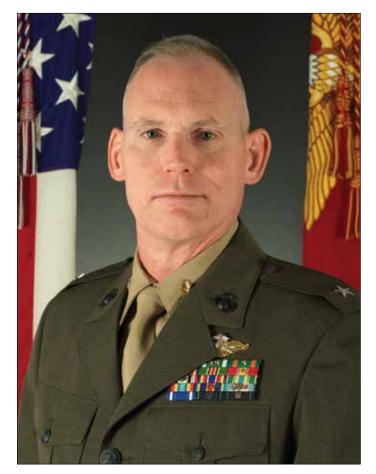
RDML Pecha graduated in 2004 "with distinction" from the Naval War College distance education program.

He earned the Fleet Marine Force Officer Warfare Qualification in 2006. In 2010, he completed Phase II of Joint Professional Military Education at the Joint Forces Staff College in Norfolk.

His personal decorations include the Meritorious
Service Medal (2 awards), Navy and Marine
Corps Commendation Medal (3 awards), Navy and
Marine Corps Achievement Medal (2 awards), Navy Unit
Commendation Medal, Meritorious Unit Citation, and various
campaign and service medals.

RDML Pecha was interviewed by C&CC Editor Kevin Hunter.

C&CC magazine sat down with RDML Pecha in order to give readers insights into how USMC Health Services views it challenges for the present and future. Though significantly smaller than the Army, RDML Pecha reminds us the Marine Corps is nevertheless an important expeditionary force always prepared to be sent abroad on short notice for combat operations, and as such faces its own battlefield medicine challenges. Like other services, the USMC must also address trials on the home front. To this end, the admiral also discusses the continued health and healing of garrisoned Marines and Wounded Warriors and the programs—some of which are in partnership with civilians—his office is working on to improve their lives.



RDML Brian S. Pecha

The Medical Officer of the Marine Corps Headquarters USMC, Health Services Arlington, VA

C&CC: Please talk about your role as USMC Medical Officer, HQ USMC Health Services.

RDML Pecha: The Medical Officer of the Marine Corps is informally known as "TMO." It's a great position, not only for me, but for any of those asked to fill the role because it requires regular interaction with top Marine leaders. There's just something different and exciting about watching leaders of Marines go about their business, a certain esprit, a certain ethos. So for me, it's a real privilege.

At the same time, it's a real challenge because as a Navy medical officer I work closely with BUMED and my Navy colleagues. Unlike the Marine Corps, where essentially all the physician positions have a direct operational component, BUMED has the huge task of operating and managing a worldwide hospital system. That's a very different mindset and it requires a different skill set and lot of business acumen. So I'm working every day in two cultures. And today, with the standup of the new Defense Health Agency, there's even more complexity.

My role essentially is to act as the advisor to the Commandant and the Assistant Commandant on any and all issues related to the health care of the force. I represent the Marine Corps to BUMED and to the DHA. I assist in developing policies related to the provision of care for the operating forces. I oversee the very skilled action officers in the Health Services department here at Marine Corps Headquarters as they deal with daily issues and with the long-term projects we're working.

We're trying to develop robust military-civilian partnerships to ensure Marines and sailors receive not only the best care but also experience the best quality of life during their treatment, regardless of whether it resides inside or out of the DoD healthcare system.



RDML Pecha and Master Chief Hospital Corpsman John Rollinger discuss goals and priorities at a weekly staff meeting. (USMC)

C&CC: Please discuss USMC Health Services' background, mission, and role as part of the USMC medical and greater DoD medical community.

RDML Pecha: The Marine Corps is "America's Expeditionary Force in Readiness." Health Service Support to this expeditionary force is made up of: Corpsmen (5,735), Medical Corps (315), Medical Service Corps (248), and Nurse Corps (20).

We provide organic health service support and force health protection to Marines wherever they're engaged. Whether in garrison, forward-deployed, or forward-engaged, Navy medical profession[al]s, officer and enlisted, are directly involved in supporting the warfighters as they respond to all manner of crises and contingencies.

Our primary focus is on ensuring world-class care to Marines and sailors, no matter where they may be. That entails providing the best trained and equipped medical personnel to Marine units in increasingly complex environments, finding and retaining men and women with diverse backgrounds, cultures, and skills while implementing new capabilities that enhance our effectiveness.

C&CC: What are some of the primary advances that are helping USMC HQ HS address the needs of Marine Corps patients at home and in facilities worldwide?

RDML Pecha: Our biggest initiative from the individual warfighter's perspective is the rollout of Marine-Centered Medical

Home (MCMH). This is a joint BUMED/USMC effort to improve the delivery of care to the operational forces in garrison and was launched in January 2013 in a pilot program. Following a patient-centered concept, the program has already demonstrably improved access to and quality of care delivered by the organic Health Service Support assets of the USMC. For example, the 5th Marine Regiment was able to decrease the number of Marines on [limited duty] by 70 percent through the improved coordination provided by their robust medical home capabilities.

The program delivers enhanced staffing, for example adding billets for clinical nurses, clerks, care coordinators, and embedded behavioral health providers. At the same time, we're improving the environment of care, to get out of the old battalion aid station model and into modern clinical facilities. Marines enrolled in one of our MCMH's can now access medical care from their aid sta—tion 24/7 via phone, secure email messaging, or in person. We're looking to expand MCMH over the next five years to the entirety of Marine Corps operational forces; this year we're working to open sixteen more sites.

C&CC: How is USMC HQ HS working to promote partnering with industry in delivering more effective and efficient know-how to the DoD medical community?

RDML Pecha: "Keeping faith" with healthy Marines, Wounded Warriors, and their families is of paramount importance to both Marine Corps and Navy Medicine leadership. In order to provide the finest care and support for them today and in the future, we need to leverage cutting edge medical research. Health Services and Navy Medicine have partnered with top educational institutions such as UCLA, Johns Hopkins University, Wake Forest, Cleveland Clinic, Rutgers, and the University of Pittsburgh. Together, we're looking for ways to provide today's Wounded Warriors with the best care possible, while ensuring tomorrow's injured receive better care—and faster care—before and after injury.

We live in austere fiscal times for the DoD. Caring for catastrophic injuries like amputations, burns, and genitourinary trauma is not only costly, it can be highly specialized. So we're trying to develop robust military-civilian partnerships to ensure Marines and sailors receive not only the best care but also experience the best quality of life during their treatment, regardless of whether it resides inside or out of the DoD healthcare system. Creating lines of communication with the business and academic worlds is essential.

C&CC: How are you addressing challenges regarding lessons learned on today's asymmetric battlefields?

RDML Pecha: You're right that the battlefield of today is different in many ways from those of previous conflicts. We've had to adapt

to different injury patterns and we've worked to incorporate advances in trauma care right up to the point of injury.

The signature injury of these conflicts, mild Traumatic Brain Injury (mTBI) associated with IEDs, has required new ways to integrate medical knowledge with mission readiness and follow-on care and rehabilitation. In addition, this kind of cooperation is leading to major advances in [protective equipment]—for example, Kevlar undergarments. So the whole way we deliver medical care in the operational setting needs to adapt, and the Pivot to the Pacific is going to require new ways of looking at this as well. Most of the knowledge gained is a capability that will be invaluable regardless of whether the threat is asymmetric or conventional.

It's critical to preserve the lessons learned throughout these conflicts, but it's equally important to keep the processes of extracting those lessons quickly and disseminating them to the field. It's a daunting task, but we're convinced that pushing the bar higher will save lives.

C&CC: Feel free to discuss any accomplishments or objectives USMC HQ HS has achieved or is working to bring to fruition.

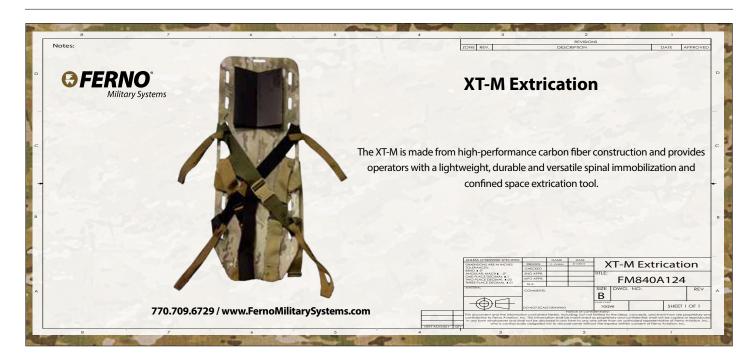
RDML Pecha: In 2013, we conducted a comprehensive Poly-Pharmacy Quality Assurance initiative to look at the care provided to Marines on three or more chronic medications. We focused on narcotic and psychotropic medications. We learned that less than 0.65 percent of the force are on three or more of these medications, and that the affected patients' unit Medical Officers were aware of the individuals and were tracking them appropriately. For 2014, we're going to be focusing on referral tracking from the deployment health assessment program.

We're working with the Naval Health Research Center to use their Expeditionary Medical Encounter Database to enhance patient care, inform and improve services, and to allow for a ready database for research. For similar reasons, DoD is partnering with the [Department of Veterans Affairs] to develop a registry of all military personnel diagnosed with TBI and/or PTSD, in order to hopefully better inform care from diagnosis through separation/retirement and beyond.

We've worked closely with the Navy's Bureau of Medicine and with the Intrepid Fallen Heroes Foundation to establish satellite National Institute Center of Excellence for TBI and Psychological Health on Camp Pendleton and Camp Lejeune. These centers provide state-of-the-art comprehensive diagnostic and rehabilitative care capabilities for Marines with chronic TBI or PTSD. These satellites also provide resource information and real time support to Marine Corps Health Service Support assets in theater or garrison. ■

What USMC Health Services Does

While not all-inclusive, Health Services currently supports deployments worldwide for Medical Contingency/Stability Operations (MCO/MSO), Stability, Security, Transition, and Reconstruction Operations (SSTRO), Humanitarian Assistance/Disaster Relief (HA/DR), Detainee operations, and Homeland Defense/Homeland Security(HLD/HLS). In addition to enhancing interoperability with naval, joint and coalition partners, Health Services is also engaged in leveraging the capabilities of government agencies and non-governmental organizations (NGOs)/private voluntary organizations (PVOs). USMC Health Services is also involved in informing Congressional & DoD requirements to improve force protection, health surveillance, and casualty care through the Quadrennial Defense Review (QDR) and its Medical Readiness Review (MRR), as well as in the drafting of Service-specific guidance and instructions.



MedTech

Expanded-use Junctional Tourniquet Cleared

The FDA recently cleared new indications for Abdominal Aortic Tourniquet use against several rapidly lethal injuries. Junctional hemorrhage is bleeding where the limbs meet the body. It presents a difficult treatment problem due to the ineffectiveness of traditional tourniquets. These areas include some of the largest blood vessels in the body, causing injured patients to bleed to death within minutes.

The new FDA clearance includes several key changes. The device was renamed to reflect what it does. It is now known as the Abdominal Aortic and Junctional Tourniquet (AAJT). It is approved for use on the groin and the axilla to stop bleeding for three hours. It is now the only junctional device to have an indication for pelvic bleeding. A relative contraindication was removed for penetrating abdominal trauma at the request of the military and with the approval of the FDA. The new clearance comes as Compression Works releases a new ruggedized device. The gauge assembly on the device is hardened at key connections. Compression Works LLC, the company behind the AAJT, continues to improve upon design that to date has a 99.4 percent reliability rating.

The AAJT uses a wedge shaped pneumatic bladder that covers a large surface area. Research at Georgia Health Sciences University showed that the AAJT works while exerting lower tissue pressures on the groin and axilla than the other junctional devices on the market. These lower pressures account for increased comfort and decreased risk to muscle and nerve tissue. A study of the Combat Ready Clamp by the Institute of Surgical Research this summer showed concern for nerve and muscle damage from the high pressures utilized by the device.

More info: speeroptech.com

TCCC Med Pack Insert

The Rescue Essentials TCCC Medical Pack Insert is built on the TCCC platform, addressing the three leading causes of preventable death on the battlefield and in the streets.

Constructed of 1000 Denier Cordura fabric and capable of use both as a pack insert and a mini trauma panel, the TCCC Medical Pack Insert has multiple supplies to address major hemorrhage, tension pneumothorax, and airway issues. Additional bandaging supplies, saline locks, and casualty recording round out this offering. With rip away, see-



through vinyl pouches, the kit's bandaging modules can be pulled and deployed to other personnel. Airway and breathing supplies are mounted on rip-away panels, as are the tools and tourniquets. Hook and loop allows for custom configuration of pouches, panels, and name tapes.

Moreover, a luminous MED patch identifies this insert for its intended purpose. The webbing handles make for easy extraction from the pack and quick mounting when used as a mini trauma panel.

More info: rescue-essentials.com

Best Practice Award for Clinical Video Telehealth Anticoagulation Program

The Veterans Affairs (VA) Maryland Health Care System's Pharmacy Service, among five other health care organizations nationwide, is the recipient of the American Society of Health System Pharmacists (ASHP) 2013 Best Practice Award presented during their recent national mid-year meeting in Orlando, FL. Sharing the honor with the VA Maryland Health Care System are the University of North Carolina Hospitals in Chapel Hill, N.C.; Harper University Hospital in Detroit, MI; Denver Health Medical Center in Denver, CO; Hospital of the University of Pennsylvania in Philadelphia, PA; and Froedtert Memorial Lutheran Hospital in Milwaukee, WI.

The ASHP Best Practices Award in health system pharmacy is an annual recognition program developed and awarded by ASHP and sponsored by Amgen, a pharmaceutical manufacturer. Since 1999, this award program has recognized outstanding practitioners who have successfully implemented innovative systems that demonstrate best practices in health system pharmacy.

Pharmacy Service at the VA Maryland Health Care System was recognized by the ASHP for the implementation of clinical video telehealth (CVT) anticoagulation services for Veteran patients in remote locations.

The new technology allows pharmacists to monitor a course of drug therapy for Veterans at their local VA outpatient clinics from other locations such as a VA medical center through videoconferencing. Medical information can be transferred by way of specially designed telecommunications equipment. VA research results suggest that CVT is an effective alternative to face-to-face visits without compromising the quality of medication therapy management services.

More info: maryland.va.gov



Academic Boot Camps

The Warrior-Scholar Project (WSP) is now accepting applications from eligible military and recently separated veterans planning on attending four-year colleges for its growing "academic boot camp" program. New courses will take place at Harvard University and the University of Michigan, joining the existing effort at Yale and allowing for more eligible veterans to attend this no cost opportunity to prepare them for academic success.

Initially launched at Yale in 2012, WSP hosts "academic boot camps" at America's top universities in order to prepare veterans to succeed in college and become leaders on campus. During WSP, veterans attend 16 hours per day of intensive courses and discussions led by prominent professors, administrators, and current student-veterans on topics including:

- Academic reading and writing,
- Adapting to changed social circumstances,
- Translating skills used and acquired in the military to the college environment, and
- Overcoming and embracing many other challenges that are inevitably confronted by non-traditional college students, especially veterans.

Active duty personnel and recently separated veterans with an actionable plan to attend a four-year university are eligible to apply. Up to 24 veterans will be accepted to the WSP at Yale, and up to 12 veterans will be accepted to the newly launched WSP programs at Harvard and University of

Michigan. WSP is offered completely free-of-charge to those selected into the program.

Program Dates

Yale: June 7th-22nd Harvard: July 5th-12th University of Michigan: July 20th-28th

More info: Alex Forrester at aforrester@ warrior-scholar.org

Military Medical Conference Kicks Off in May

This year's DoD/VA Healthcare 2014 conference will run from 19-21 May in San Antonio, TX. Put on by the Institute for Defense and Government Advancement (IDGA), the conference will feature speakers from the Office of the National Coordinator on Health Information Technology, Army Reserve Medical Corps, and the San Antonio Military Medical Service Brain Surgery Rehabilitation Service, among others. According to IDGA, "DoD/VA Healthcare"

2014 is all about progress, so throughout the program we will feature case studies on the newest research and development of military and veteran healthcare. This year, we will also take an in depth look at four areas of growth in military and veteran healthcare during our pre and post conference workshops. We'll not only look at what's currently important to the DoD and VA, but also what's important for the future of military healthcare."

On 19 May, attendees may earn two CME credits for attending workshops on women's health, EHR, vocational rehabilitation, and TBI.

More info: dodhealthcare.com

Updated Lights Hit the Streets

Streamlight Inc. has updated the brightness and design of its PolyTac and PolyTac HP polymer flashlights. Each light features a power LED that delivers up to 275 lumens and an improved grip,

as well as a programmable switch that gives users the choice of three operating modes. The all-purpose PolyTac is designed for the broadest range of lighting applications as its C4 LED and parabolic reflector produce a concentrated beam with optimum peripheral illumination. On high, the light delivers 275 lumens and 9,500 candela over a beam distance of 195 meters.

The PolyTac HP is engineered to provide enhanced down-range illumination. It combines a C4 LED with a deep reflector to produce a far-reaching, targeting beam with a tight spotlight, in addition to optimum peripheral illumination. On the high setting, it provides 275 lumens and 19,000 candela over a beam distance of 275 meters. New models offer three hours of run time on high, up to 65 hours on low, and 5.5 hours in strobe mode. Both are powered by two 3 Volt CR123A lithium batteries.

More info: streamlight.com





By Kevin Hunter, C&CC Editor

kedco Inc. was founded on
December of 1981 for the purpose
of manufacturing and marketing
the Sked Stretcher System, the first-ever
casualty evacuation (CASEVAC) kit. It was
and still is a litter in a carrying case with all
necessary accessories for rope rescue, a spine
immobilizer, the Oregon Spine Splint, and
a flotation system that floats the Sked in a
nearly vertical position and is self-righting if
capsized.

Since the Sked System was introduced and standardized, Skedco has produced many new and innovative products (over 200 and counting). The Sked system was tested for nearly two years before it was standardized in 1986. It is currently the standard battlefield litter.

Light, Strong, Versatile

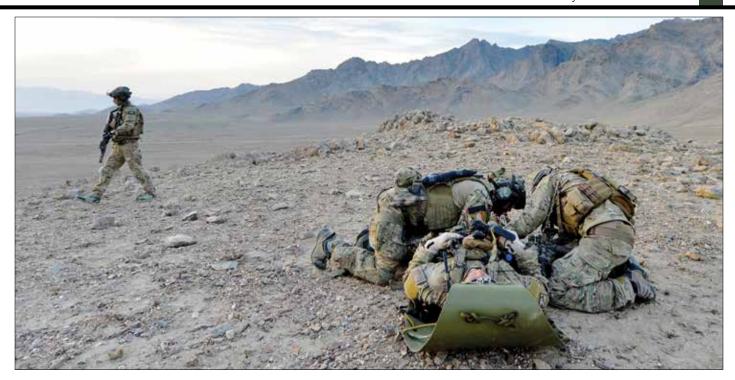
The Sked is made from a proprietary easy glide medium density polyethylene plastic that is very abrasion resistant, unbreakable at



-120 degrees Fahrenheit, and very functional in desert and jungle applications. It has grommeted holes with straps sewn into them to secure the patient. The addition of Cobra buckles has been very well received, and now Skedco produces Cobra buckle kits to retrofit existing Skedco litters to save money. The Sked body weighs 11 pounds, while the basic system weighs just over 16 pounds.

MEDEVAC Enhanced

Designed with CASEVAC in mind, Skedco's Oregon Spine Splint (OSS) Sked Combination had to be small, lightweight, and very efficacious. Adding the Cobra buckles to the Sked in 2005 made it possible for one soldier to deploy the Sked and package a patient in as little as one minute. If a spinal injury is suspected, the OSS is used to immobilize the patient. Possibly the only short spinal immobilizer that meets all of the criteria established by Pre-hospital Trauma Life Support (PHTLS) of the National Association of Emergency Medical Technicians, among others, for immobilizing a seated patient, the OSS when used with a Sked litter is equal to a long backboard. It is more compact and comfortable, able to assist with virtually any kind of rescue. Sked is the only rollup litter that has an airworthiness release. It can be dragged, carried, and hoisted for rope rescues or into helicopters.



Above: Air Force Pararescue Jumpers (PJs) secure a wounded warfighter. Opposite page: PJs hoisting a Skedco litter. (Air Force photos)

The OSS fits inside a rolled Sked inside its carrying case. It is deployed and applied in minimal time. It allows immobilization of the spine and can retract the shoulders in the event of a clavicle fracture. The OSS comes with a shoulder board that fits behind the patient's shoulders to prevent the flexible Sked from rolling the shoulders forward and placing pressure on them, thus eliminating unnecessary pain when being carried or hoisted. The OSS is the choice of the U.S. Army and militaries of several other countries around the world. Below deck in ships and submarines an immobilized patient in a Sked and OSS can easily pass through 16-inch scuttles and other very small spaces.

The OSS has shoulder straps that prevent the patient from moving upward on the device that can be reconfigured to retract the shoulders. Groin straps prevent downward movement and also never overtighten when the patient is taken from sitting to supine position and two body straps. The straps and buckles are all color coded for easy use. The design allows total access to the anterior torso for any prehospital diagnosis or treatment without compromising the immobilization, which is not possible on other devices. One person can quickly immobilize a spinal injured patient if he follows the Skedco technique that was blessed by PHTLS years ago.

All Float, No Boat

The Sked's flotation system consists of two float logs that attach to slots in its sides using beefy plastic side-release buckles for safety. The float position keeps the patient's head above water when it is being towed, with the chest pad self-righting the litter in case of capsizing; the ballast causes the Sked to float in a nearly vertical position. If the system is in a rapid deployment bag, it can be deployed in as little as 30 seconds ready to receive a patient. It can be pre-rigged with a tag line to prevent litter spin when hoisted by helicopter. Patient packaging in the water can be accomplished by one person in as little as 20 seconds. (Add another 40 seconds to prepare for helicopter hoist if the tag-line is pre-rigged prior to deployment).

CASEVAC and Safety

Skedco also manufactures a full capability CASEVAC Kit that will attach very securely to a vehicle using a very strong supersize MOLLE-type attachment. It features an attachment sleeve that contains the detachable litter carrier with a litter and all necessary medical equipment. Pockets on the inside secure patient litter straps, litter tiedown straps, carabiners, and aviation snap hooks. There is a shroud to protect it from weather that doubles as a carrier for the patient's gear. It is mounted inside or outside the vehicle.

The Skedco-designed tag-line is attached to the Sked or other litters when hoisting into helicopters to prevent litter spin. A V-strap is connected to the litter using carabiners. It is attached to the rope using two screw links with a weak link that breaks at 150 pounds to insure safety of the aircraft and crew.

"State Of The Art" Forward

Skedco manufactures medical equipment set bags for helicopters that have, like the other Skedco products, been battle proven to make rescue and medical treatment easier. Skedco produces medical packs and bags such as our revised Pringle CLS Chest bag and the Maltz medical assault pack, both of which can double as a hanging panel in vehicles and aircraft. Skedco's individual first aid kit features the tourniquets on the outside for quick access and the patented "Tactical Release" MOLLE attachment. Lastly, the Skedco Mout Lifeline can be connected to a Velcrofaced MOLLE attachment, with the end of the rope attached to the drag handle on body armor; so if a soldier is down in the line of fire, it is thrown (tangle-free) to someone who pulls him to safety without exposing himself.

More info: skedco.com

Concline & In Combat A look at institutions of higher learning offering courses for servicemembers and veterans



Easing Transition through **Education**

By Scott Stratton, Military Liaison and Senior Executive Advisor, DeVry University

eVry University assists with the transition from combat to college through administrative, academic, and peerveteran support. Year-round flexible scheduling and degree programs available in online formats help make higher education a reality for many military and veteran students and provide a solid foundation for their career success.

One of DeVry University's most unique offerings for veterans is the DeVry Military Resource Club (DMRC), headquartered at the DeVry University campus in Addison, IL. Established in 2008, the DMRC strives to build a healthy camaraderie and keep military traditions alive by engaging DeVry students with service backgrounds in group activities and team building exercises including sporting events, movies, concerts, paint ball matches, and classroom help. The DMRC also acts as a liaison between student veterans and the Veterans Affairs (VA) office. In fact, a representative from the health outreach office of the VA visits the Addison campus twice a month to address benefits issues and answer any questions.

DeVry University also provides services to aid in the education of those that are currently deployed. For example, DeVry University's Student Central service model offers specialists trained to work with military students studying online. In addition, DeVry University encourages military students to use the ASPIRE Veterans Assistance Program, a one-stop center for resources about dealing with post-traumatic stress disorder, transitioning from service to civilian life, adapting to school, and more.

More info: devry.edu



Fostering a Culture for Military Education

By Col. (Ret.) Garland Williams, Vice President of Military Relations, University of Phoenix

niversity of Phoenix works directly with active-duty service members, their spouses, and veterans to help them balance frequent deployments, relocations, and training schedules while fulfilling their education goals. The University's military students access classes online or at more than 100 University of Phoenix locations, giving them an opportunity to choose the learning environment that is most conducive to their educational success. University of Phoenix offers accredited degree programs in business, criminal justice and security, information systems and technology, nursing, health care administration, and psychology. Degree programs range from associate to doctoral, in addition to various certification specializations.

University of Phoenix's military students work with military-specific enrollment, academic and finance advisors. Many of the advisors have prior military service or are military spouses and can identify with the unique challenges active-duty military members, their spouses, and veterans face when pursuing a degree.

In addition to helping service members and their families reach their education goals, University of Phoenix is dedicated to helping the military community successfully transition from active-duty to the civilian workforce. The University has resources through the Phoenix Career Guidance System that allows service members to research jobs and degree programs in specific areas, as well as take a career interest assessment to discover areas that align with the service member's current military career.

More info: phoenix.edu/military

WARFIGHTERS GEAR GUIDE

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Scalable, On-Demand Blood

Red blood cells are the most transfused blood product in battlefield trauma care. Unfortunately, they are sometimes in limited supply in a battlefield environment. DARPA created its Blood Pharming program to potentially relieve this shortage by developing an automated culture and packaging system that would yield a fresh supply of transfusable red blood cells from readily available cell sources. If the program is successful, it will eliminate the existing drawbacks of laboratory grown red blood cells, including cost, production efficiency

and scalability, compared to those grown inside the human body. Pharmed blood could also offer additional benefits. These potential benefits include eliminating the risk of infections from donors, on-demand availability, avoiding the detrimental effects of storing donated blood, and circumventing the issue of matching blood types between donor and recipient.

Under the Blood Pharming program, DARPA has decreased the cost of the chemical stock required to support blood growth for one unit of blood from more than \$90,000 per unit to less than \$5,000 per unit. DARPA believes that future reductions in the cost of chemical stock for unmodified red blood cells will eventually make pharmed blood practical for basic transfusions. Recently, in addition to reducing production costs, DARPA performers have been investigating how pharmed red blood cells can potentially be modified to serve as vessels that can hold a variety of medical payloads, including vaccines, anti-toxins, diagnostics, and antibodies to neutralize pathogens.

Programs Spotlight

Battlefield Medicine

Battlefield logistics are a challenge regardless of the mission. Adversaries, terrain, and the environment can all serve to complicate the process of delivering supplies to warfighters. The current DoD approach to medical supply logistics is limited in its reach to far-forward emergency settings, response to emergent in-theater threats, and utility for bio-preparedness stockpiling. It can often take weeks to months to manufacture and airlift organic pharmaceuticals and protein therapeutics to battlefield frontlines, meaning that critical medical supplies often do not arrive in time where they are needed most. Furthermore, the need to prepare medical supplies in advance based on an anticipated, specific threat can result in wasted materials, labor, and money when that threat is not realized.

DARPA's Battlefield Medicine program seeks to address this capability gap through two integrated research thrusts: the Pharmacy on Demand (PoD) and Biologically-derived Medicines on Demand (Bio-MOD) initiatives. The combined efforts seek to develop miniaturized device platforms and techniques that can produce multiple small-molecule active pharmaceutical ingredients (APIs) and therapeutic proteins in response to specific battlefield threats and medical needs as they arise. Additionally, the platform would have built-in flexibility to produce multiple types of therapeutics through its modular reaction design. The ultimate vision for Battlefield Medicine is to enable effective small-batch pharmaceutical production that obviates the need for individual drug stockpiling, cold storage, and complex logistics.

Surviving Blood Loss

The Surviving Blood Loss (SBL) program is developing novel strategies to radically extend the time injured warfighters can survive critical blood loss on the battlefield before initiation of fluid and blood resuscitation. Achieving this goal will allow increased time—as much as hours or days—for evacuation, triage, and initiation of supportive therapies. An interdisciplinary effort is underway to develop comprehensive understanding of energy production, metabolism, and oxygen use and to identify and control the protective mechanisms that preserve cellular function despite critically depressed oxygen delivery.

Investigational focus areas include mechanisms to control the metabolic state on demand, including induction of a hibernation-like state, and development of low-volume therapies that reduce tissue demand for oxygen and metabolites when full resuscitation is not available.

Significant progress has been made achieving program goals including metabolic rate reduction using hydrogen sulfide—exposure to low levels of hydrogen sulfide were shown to induce a hibernation-like state in mammals, which is highly protective against blood loss or low-oxygen environments.

Wound Stasis System

Uncontrolled blood loss is the leading cause of death for warfighters on the battlefield, according to the U.S. Army Institute of Surgical Research. The vast majority of such fatalities are from wounds that are not accessible by combat medics for traditional treatments, like direct compression. For example, in the case of internal injuries to the abdominal cavity, medics can neither visualize the damage nor access it to provide treatment. As a result, rapid and uncontrolled blood loss often leads to death before transport from the battlefield to a surgical setting can occur.

DARPA created the Wound Stasis System (WSS) program to pursue a stabilizing treatment that would keep injured warfighters alive until they could be delivered to a surgical setting. WSS began as a basic research program to identify biological mechanisms for distinguishing between healthy and wounded tissue, with the goal of controlling bleeding by binding to the wound. Currently, the focus is on a foam material as the primary hemostatic agent, with an aim to develop a stasis material and delivery system, suitable for use by combat medics at the point of injury for wound stabilization prior to medical transport. Such a system would effectively treat noncompressible wounds, regardless of geometry or location within the abdominal cavity, and would not require direct visualization of the wound by the medic.

More info: darpa.mil

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6th Medical Group: Robust and Ready



The U.S. Air Force's 6th Medical Group, 6th Air Mobility Wing, MacDill AFB, FL, is the only medical installation in DoD supporting two Unified Combatant Command headquarters.

By 6th AMW/Public Affairs

he origins of medical service at MacDill Air Force Base (AFB) date back to the very beginning of the base itself. The area surrounding the current base was first used in a military manner as a staging area during the Spanish-American War. Later, the land at the southern tip of the south Tampa peninsula was donated by the city of Tampa to the United States War Department in 1936 and construction on base began in September 1939.

The MacDill Hospital was established in 1940. Sixteen years later, a new facility opened that would operate until 2009. The current and primary facility has been open since then, along with our Geographically Separated Unit, the MacDill Community.

Focused Mission

The 6th Medical Group (MDG) supports a globally-focused active duty Air Mobility Wing, an Air Force Reserve Command Air Refueling Wing, two Combatant Commands, the Hurricane Hunters of the National Oceanic and Atmospheric Administration, and the Joint Communications Support Element. The over 700-person team executes its daily mission at more than a dozen facilities on and off base. The 6th MDG mission statement, "Prepare, Prevent, Heal, Deploy," serves as a foundation for achieving a vision of becoming the

U.S. Air Force's premier patient-centered medical home.

Daily Taskings

The 6th MDG supports the largest single-unit catchment area of eligible beneficiaries anywhere in the country. In 2013, MDG filled more than 624,000 prescriptions and had 165,000 patient encounters, while ensuring thousands of soldiers, sailors, airmen, and Marines deployed to locations around the globe.

MDG relies on partnerships with local communities to extend its capabilities, including connections with St. Petersburg, Bay Pines, and James A. Haley Veterans Administration hospitals and several civilian hospitals. These partnerships enable Air Force medics to train and develop the skill sets needed to ensure premier healthcare is available to those who defend the nation.

Squadron Breakout

The 6th Medical Group comprises four squadrons



The Aerospace Medicine Squadron consists of flight and occupational medicine services, optometry, public health, bioenvironmental engineering, and the health and wellness center. Each of these flights administers to our readiness mission.



The Medical Operations Squadron executes the patient care mission to include family medicine, our Brandon Clinic, pediatrics, internal medicine, a growing specialty clinic, and an expanding surgical service.



The Dental Squadron provides comprehensive dentistry, dental lab services, prosthodontics, endodontics, and oral surgery to our active duty force and plays a significant role in ensuring the overall medical readiness of our joint military force.



The Medical Support Squadron balances our budget; oversees managed care and enrollment missions; and ensures safe and effective facility operations, an on-time logistics mission, and that our robust pharmacy, lab, and diagnostic imaging missions keep up with our growing demand. The squadron also ensures our readiness mission is fully aligned with expectations from the 6th Mobility Wing up to the DoD.

SPIF

More info: www.macdill.af.mil/units/6thmedicalgroup







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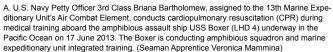
A look at those training for the challenges of combat medicine





C. Two 10th Mountain Division soldiers assess the damage of a Humvee that was struck by a simulated road side explosive. The soldiers are tasked with safely extracting any casualties from the vehicle and stabilizing them for a medical pickup. (Sgt. Steven Peterson)

D. Navy Petty Officer 3rd Class Caleb T. Carlson, left, Navy Petty Officer 3rd Class Ruben E. Ramirez, center, and Navy Lt. Chad B. Craft, right, monitor the vital signs of a wounded Marine during Exercise Steel Knight 2014 on Marine Corps Air Ground Combat Center, Twentynine Palms, CA, on 13 December 2013. Carlson, Ramiraz, and Craft, hospital corpsmen, are assigned to Head-quarters Company, 1st Battalion, 5th Marines. (Cpl. Justin A. Bopp)



B. Afghan Commandos from 2nd Company, 7th Special Operations Kandak, compete at correctly evaluating and treating simulated casualties during combat medic training in Washer district, Helmand province, Afghanistan, on 16 March 2013. The commandos, along with their coalition force mentors, review basic combat medical skills to increase survivability and combat effectiveness. (Sgt. Benjamin Tuck)

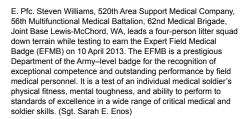












F. U.S. Navy Reserve sailors carry a simulated casualty over their heads to keep the wounded service member dry so they can evacuate him to safety. (Sgt. Steven Peterson)

G. U.S. Air Force Airmen assigned to the 4th Fighter Wing conduct self aid buddy care procedures on moulage victims during an active shooter exercise on Seymour Johnson Air Force Base, N.C., on 4 February 2013. Security Forces, fire department, and medical personnel were among those evaluated in the training exercise. (Airman 1st Class John Nieves Camacho)

H. U.S. Navy HM2 Edgar Arabaca, a service corpsman with the 3rd Medical Battalion, Combat Logistics Regiment 35, 3rd Marine Logistics Group, III Marine Expeditionary Force, right, demonstrates an intravenous injection on Philippine Marine Private 1st Class Rixson Romo, a driver with the Marine Transportation and Maintenance Battalion, during combat life saver training at Camp O'Donnell on 13 April 2013. The training was part of Balikatan 2013, an annual bilateral training exercise currently in its 29th iteration. BK13 is designed to enhance interoperability between both forces and strengthen military-to-military relations. (Sgt. Jerome S. Tayborn)



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May 11-15 AsMA San Diego, CA asma.org May 19-21 DoD VA Healthcare San Antonio, TX idga.com

May 20-22 SOFIC Tampa, FL sofic.org

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