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Winter 2018

**UPGRADING
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FACILITY-LEVEL**

COMMANDER'S CORNER



LTC William Bimson

Command Surgeon
82nd Airborne Division
Fort Bragg, NC



**CAPT Michael
Spooner**

Director
Healthcare
Simulation
and Bio-skills
Training Center



**Dr. Steven E.
Braverman**

Director
Edward Hines Jr.
VA Hospital
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CLOSING THE VIRTUAL TO REAL-WORLD IMMERSION GAP

Naval Medical Center Portsmouth Healthcare Simulation and Bio-skills Training Center (NMCP HSBTC) offers an immersive environment that accommodates anything from basic skills practice and training to large-scale mass casualty scenario simulations.

By Christian Sheehy

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Facilitating Next-Level Healthcare

The DoD recently completed deployment of its Military Health System (MHS) GENESIS electronic records software suite at all initial fielding sites.

By PEO Defense Health Management Systems



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Tapping Advances in Spinal Cord Care

The Veterans Health Administration (VHA) is advancing spinal cord injury (SCI)-related care for injured U.S. servicemembers.

By Dr. Steven E. Braverman



PG 23 **INDUSTRY PARTNER**

Mitigating Thoracic Trauma through Proactive Care

H&H Medical Corporation has introduced a compression chest seal technology to contain potentially-massive point-of-injury bleed outs.

By Paul X. Harder



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Seeing What the Eye Cannot

A new hand-held diagnostic device helps determine the presence of intracranial bleeding in victims of head trauma.

By Edward Lundquist

Cover: U.S. Army Paratroopers assigned to the 173rd Airborne Brigade Support Battalion, 173rd Airborne Brigade, conduct a medical simulation training inside the Gunfighter Gymnasium at Caserma Del Din, Vicenza, Italy. The 173rd Airborne Brigade is the U.S. Army Contingency Response Force in Europe, capable of projecting ready forces anywhere in the U.S. European, Africa or Central Commands areas of responsibility within 18 hours. (U.S. Army photo by Antonio Bedin)

COMMANDER'S CORNER



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LTC William Bimson

82nd Airborne Division Command Surgeon
Fort Bragg, NC

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INSIGHTS

A major challenge facing 21st-century combat medics is finding more effective methods to stem massive hemorrhage. Finding ways to maximize existing capabilities while implementing new technologies is on the mind of today's military medical professionals. From point-of-injury treatment to surgical intervention to diagnostic examination, staying one step ahead of the often-unseen bleed can be the difference between full casualty restoration and long-term treatment and rehabilitation.

The Winter 2018 issue of Combat & Casualty Care takes a look at a trifecta of medical preparedness driving current-day defense application, from active duty combat medicine training and simulation to field surgical best practices to the long-term health and well-being of our nation's wounded veterans. In this issue's lead feature, Naval Medical Center Portsmouth's Healthcare Simulation and Bio-Skills Training Center (HSBTC) brings together physical medicine formats such as surgical technique, anesthesia, obstetrics, and pediatrics to name a few, under the umbrella of a state-of-the-art immersive simulation environment. On the cover, readers hear from the Command Surgeon for the U.S. Army's 82nd Airborne Division, LTC William Bimson, as he speaks to advances and challenges in enabling greater surgical capability at or near the point-of-injury for positive post-trauma outcomes.

As hemorrhagic events are often undetectable by the human eye, we highlight a technological breakthrough in the early detection of internal head hemorrhage. With time so critical following a traumatic head injury and severe shock not always obvious, a newly introduced hand-held infrared spectroscopy capability called the Infrascanner is enabling quicker pre-diagnoses of intracranial hematomas or "brain bleeds" in the field where a CT scan is not available. As emphasis is being placed on advancing health solutions for servicemembers suffering debilitating physical trauma, Edward Hines Jr. Veterans Hospital is at the forefront of the ongoing fight to improve outcomes.

Be sure to catch up on DoD's deployment of its Military Health System (MHS) GENESIS electronic health record accessibility program. The web-based Patient Portal, under the direction of the Program Executive Office Defense Health Management Systems (PEO DHMS), has gone "live" at Madigan and Bremerton medical centers, enabling online patient access to health information in real time.

As always, we welcome your feedback and appreciate your continued readership!

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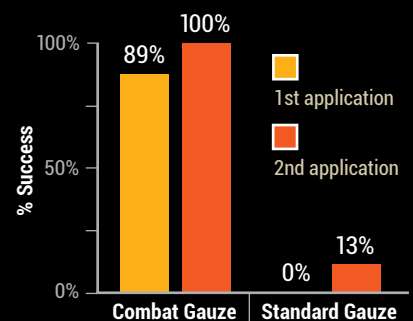
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CLOSING THE VIRTUAL TO REAL-WORLD IMMERSION GAP

Naval Medical Center Portsmouth Healthcare Simulation and Bio-skills Training Center (NMCP HSBTC) is a state-of-the-art center comprised of rooms for virtual surgery, anesthesia, obstetrics, pediatrics, and immersive environment training that accommodates anything from basic skills practice and training to large scale mass casualty scenario simulations.

By Christian Sheehy, Editor



Instructors watch as students of the Navy's first Role 2 Light Maneuver (R2LM) course participate in a combat surgery training exercise on a mannequin. The objective of the pilot course, being held at Surface Warfare Medical Institute (SWMI) East, a detachment of Navy Medicine Operational Training Center (NMOTC), is to build a mobile unit equipped to set up a functioning medical area with advanced trauma life support capabilities. (U.S. Navy photo by Mass Communication Specialist 2nd Class Michael J. Lieberknecht)

With over 8,000 square feet of physical space, the Healthcare Simulation and Bio-skills Training Center (HSBTC), Naval Station Portsmouth, VA, spans 5720 square feet of contiguous space. The center has two training conference rooms which can accommodate 23 and 48 students each. These rooms have multimedia capability to facilitate lecture, discussion, debriefs, webinars, and hands-on training. Administrative offices for the HSBTC Director, Deputy Director, Manager, Nurses Educators and Simulation Technicians are located within the center which offers customers easy access to HSBTC staff expertise. Two large supply rooms on site offer easy access to supplies and equipment.



CAPT Michael Spooner
HSBTC Director

"Our simulation center was established in 2006 primarily to complement our Graduate Medical Education programs," said CAPT Michael Spooner, HSBTC Director. "Over the course of the past 11 years, and primarily after achieving accreditation in 2015 from the American College of Surgeons, we began to strengthen the educational rigor of our curricular offerings. Specifically, we saw the expansion of the Center into new and exciting areas, such as support of pre-deployment courses for military trauma surgical teams, as well as building patient safety instructional programs that advanced the teamwork and skill levels of our medical teams in the medical center."



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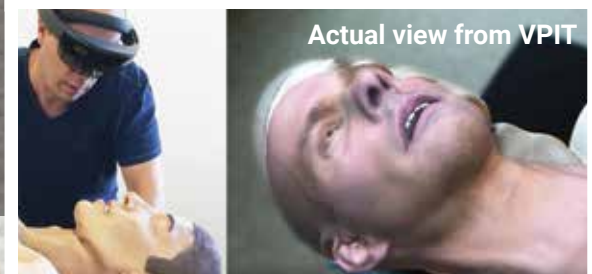
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Instructors watch as students of the Navy's first Role 2 Light Maneuver (R2LM) course participate in a combat surgery training exercise on a mannequin. The objective of the pilot course, being held at Surface Warfare Medical Institute (SWMI) East, a detachment of Navy Medicine Operational Training Center (NMOTC), is to build a mobile unit equipped to set up a functioning medical area with advanced trauma life support capabilities. (U.S. Navy photo by Mass Communication Specialist 2nd Class Michael J. Lieberknecht)

The Bio-skills Center can accommodate training/research on several cadaver and anatomical specimens at any given time due to the layout of the space. Four dry stations accommodate anatomical specimen use and two wet stations can accommodate full cadavers. Storage for up to 14 cadavers is currently available. Freezers for fresh frozen anatomical specimens are also available. An administrative support space is provided within the center which allows access to support staff at all times during training and research activities.

The center, accredited by American College of Surgeons – Accredited Educational Institutions, provides state-of-the-art simulation-based medical training to the U.S. Armed Forces as well as the local community. The center serves all 14 graduate medical education programs with weekly trainings; provides multi-disciplinary sustainment skills, safety and team-based trainings to all disciplines and specialties; as well as provides combat casualty care immersive training to deploying troops. Since it opened, the HSBTC has trained over 25,000 Department of Defense (DoD) and civilian healthcare professionals and has expanded capabilities to over 50 different simulators including various task trainers, standardized patients, low- and high-fidelity mannequins, cut suits and the latest in three-dimensional virtual simulation.

Targeted Curricula

The center has been instrumental in the development of various curriculums to include Simulation Training for Operational Medical Providers (STOMP), Hospital Corpsmen Fleet Instructional Readiness and Simulation Training (HM FIRST) and Nursing Education and Skills Simulation Training (NESS). In addition, the center has facilitated

multiple operational courses to include Fleet Surgical Team pre-deployment training, Expeditionary Resuscitative Surgical System pre-deployment training, Role Two Light Maneuver, and special forces medic training. The center also supports inter-professional team training evolutions such as the Perinatal Safety Stand-down. The HSBTC is currently involved in six approved research protocols and has several studies and associated grants focusing on further improving combat casualty care:

Operational Medical Providers: As mentioned above, STOMP addresses 23 core skills from eight different subspecialties that deal with primary care medicine. Skills included in this curricula are toenail removal, use of a slit lamp, splinting and fracture reduction, suturing, skin biopsies, and intra-uterine device removal. It also allows evaluation and feedback on five standardized patient scenarios and provides primary care lectures in dermatology, orthopedics and psychiatry. The purpose of the curricula is to provide an opportunity to rehearse and practice non-trauma primary care medicine skills in a proctored setting before practicing independently.

Hospital Corpsman Fleet Instructional Readiness: HM FIRST is a program designed to provide a proctored educational session through simulation task trainers, simulation scenarios, and lectures to refine hospital corpsmen skills. Historically, hospital corpsmen who work in the medical center may start to lose some of their core skills prior to returning to the fleet or serving with the Marines where they may be one of only a couple of medical staff assigned. This curriculum focuses on areas such as rapid assessment, physical examination, documentation, nail removal, wound closure, urinary catheterization and intravenous access.

Nursing Education Skills and Simulation Training: We designed NESST to utilize simulation to allow actual hands-on practice of day-to-day tasks that are expected of nurses who work the floors of the medical center, again in a proctored setting. All nurses and corpsmen who rotate to the medical center attend the course – they are exposed to intravenous access, crash cart orientation, dressing wounds, managing intravenous pumps and blood administration, among other skills.

A key moment in the evolution of courses occurred in 2014 when the Navy Specialty Leader for Interns contacted HSBTC about working to develop a course that would allow outgoing general medical officers the opportunity to rehearse, learn and be evaluated on their new core privileges prior to departure from the medical center. Out of this discussion, the STOMP curriculum was developed and is now going on its fourth year and has expanded to other Department of Defense sites. After STOMP was initiated, HSBTC began to see the expansion of similar skills curricula into other areas. Navy enlisted leadership came together and developed simulation skills curricula for corpsman who are transitioning back to the fleet – the course is known as HM FIRST. Other groups, such as the internal medicine physicians, have also started utilizing their own simulation curricula to maintain core privileges in preparation for future deployments.

The Simulation Center also provides the following pre-deployment training upon request of the fleet forces:

Fleet Surgical Teams: This program was designed as a response to ensuring Fleet Surgical Teams who integrate with the crew of the

amphibious assault ships (LHDs/LHAs) have rehearsed together as a team in caring for trauma casualties. During deployment, these ships function as a primary Role 2 support activity. The program works through several simulation scenarios and lectures prior to a large “capstone exercise” utilizing mannequins, surgical cut-suits, and simulated casualties (using simulated patients with moulage) that occurs on the actual ship. The team is evaluated during three exercises throughout the day on their performance to allow deliberative practice and team performance growth.

Expeditionary Surgical Resuscitative Surgical Systems (ESRSS) or Role Two Light Maneuver (R2LM): With similar team performance and resiliency goals to the Fleet Surgical Team Training, this training is geared specifically for the smaller seven- to nine-person Damage Control Surgery Teams that may be called on to perform Role 2 capabilities on a wide range of diverse platforms at sea or ashore. This three-week training event developed and facilitated primarily by the Surface Warfare Medical Institute (SWMI) integrates multiple team training events that again culminate in escalating medical simulation events administered by our Center and eventually two large mass casualty “capstone” events. The final of these events is a 48-hour prolonged field care exercise. The team is evaluated and provided direct feedback on their performance during the event.

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Hospital Corpsman 2nd Class Kevin Munro, a student of the Navy's first Role 2 Light Maneuver (R2LM) course, simulates evaluating a patient's condition during a combat surgery training exercise on a mannequin. The objective of the pilot course, being held at Surface Warfare Medical Institute (SWMI) East, a detachment of Navy Medicine Operational Training Center (NMOTC), is to build a mobile unit equipped to set up a functioning medical area with advanced trauma life support capabilities. (U.S. Navy photo by Mass Communication Specialist 2nd Class Michael J. Lieberknecht)

to operational forces and their families,” said CDR Joy Greer, HSBTC Deputy Director. “Research-related efforts help determine optimal simulation training methods to maximize the readiness of our medical teams as well as patient safety and quality health care.”

Center research efforts fall into several categories:

Operational/In-Garrison Care: Ongoing IRB-approved research protocols sponsored by investigators from the HSBTC include investigating the effectiveness of simulation training to improve the in-garrison care by corpsmen (HM First), General Medical Officers (STOMP), and Internal Medicine physicians (IM Sustain).

MTF-Based Simulation Research: Ongoing IRB-approved protocols investigating application-based training for crash cart familiarization, obstetric simulation training and teamwork (OB-StaT) to reduce postpartum hemorrhage, simulated Electronic Fetal Monitoring app with the University of Tennessee-Knoxville, and pediatric confidence and skill in managing high-risk, low-volume pediatric emergency scenarios.

Combat and Casualty Care: We are currently collaborating with investigators from Old Dominion University on a protocol entitled “The Development of an Innovative Role 2 CPG-based Trauma Patient Knowledge-Assessment Instrument and Training Materials that utilize Deliberative Practice and Mastery Training.” This protocol is developing a game-based assessment of trauma knowledge for



CDR Joy Greer
HSBTC Dep. Director

healthcare providers in Role 2 environments. A second collaborative project that will be initiated shortly with investigators from Purdue University will investigate the effectiveness of telementoring in trauma surgeries and is entitled “See-What-I-Do: Increasing Mentor and Trainee Sense of Co-presence in Trauma Surgeries with the STAR platform.”

Some of the previous research efforts supported by the HSBTC focused on enhancing combat and casualty care include simulation training investigating skill retention in the use ITClamp™ for junctional hemorrhage, training and communication for en route care providers, use of tension pneumothorax cadaver models to determine optimum location of needle decompression, and device stability in simulated casualty movement.

Future research areas of interest specifically related to combat and casualty care include working with collaborators to investigate the impact of noise on team performance in austere environments, junctional hemorrhage control with REBOA, TCCC, and bleeding control skills for non-medical personnel.

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MANAGING COMBAT TRAUMA THROUGH ADVANCED FIELD SURGICAL CAPABILITY

Combat & Casualty Care had the opportunity to speak with LTC William Bimson, Command Surgeon, U.S. Army 82nd Airborne Division, and MAJ Manuel Menendez, Commander, 759th Forward Surgical Team (Airborne), 28th Combat Support Hospital, 44th Medical Brigade, regarding the role of combat medical teams in advancing Army Medical Command (MEDCOM) objectives including the promotion of enhanced field surgical capabilities at the point of injury across a global theater of operations.



LTC William Bimson

LTC Will Bimson is the current 82nd Airborne Division Surgeon at Ft Bragg, NC, home of the Airborne and Special Operations Forces. In this position he serves as a special staff officer as the senior medical advisor to Division Commanding General. The Division medical component includes over 900 medical personnel including over 60 credentialed providers, 840 Combat Medics and various medical technicians that allow for the provision primary care and trauma care services

both in garrison and in deployed austere conditions.

LTC Bimson attended Truman State University earning his Bachelors in Science degree in Chemistry and received his Army Commission through the Army ROTC program in 1997. He immediately entered A.T. Still University of the Health Sciences, formerly Kirksville College of Osteopathic Medicine, using the Army Health Professions Scholarship Program to earn his Doctor of Osteopathy degree in 2001. He went on to complete his Internal Medicine residency in 2004 and his Cardiology Fellowship in 2007 at Walter Reed Army Medical Center in Washington, DC.

LTC Bimson stayed on at Walter Reed as Cardiology Faculty until 2010 when he moved to Ft Belvoir, VA, as the Chief of Internal Medicine and Specialty Care helping to plan for and open the new Ft Belvoir Army Community Hospital. He would later serve as the Deputy Commander of Clinical Services (Chief Medical Officer) at Moncrief Army Community Hospital at Ft Jackson, SC, from 2013-2015 before moving to Ft Bragg, NC, as the 82nd Airborne Division Sustainment Brigade Surgeon. He assumed the Division surgeon position in August 2016.



MAJ Manuel Menendez

MAJ Manuel Menendez currently serves as the commander of the 759th Forward Surgical Team (Airborne), 28th Combat Support Hospital, 44th Medical Brigade, Ft. Bragg, NC. This team provides a rapidly deployable airborne surgical capability in support of Airborne and Special Operations Forces. In the past 12 months this team has supported the Global Response force mission, participated in multiple joint readiness exercises as well as a Joint

Readiness Training Center rotation; and is currently in the process of deploying in support of Operation Freedom's Sentinel.

MAJ Menendez enlisted into the Army as a Combat Medic (91B) in August of 1992 and earned a Bachelors in Physician Assistant Studies from Methodist University in 2004. He then commissioned in the Army Medical Specialist Corps in 2005, and earned a Masters in Physician Assistant Studies from the University of Nebraska Medical Center in 2014.

MAJ Menendez' previous assignments include the 212th Mobile Army Surgical Hospital, 1/377 Airborne Field Artillery Regiment (Air Assault), 1/319th Airborne Field Artillery Regiment, Regimental Special Troops Battalion 75th Ranger Regiment, 3rd Battalion 75th Ranger Regiment, Joint Special Operations Command, and also served as an instructor at the AMEDD Captain Career Course, and most recently served as the Executive Officer to the Commanding General AMEDD Center and School Health Readiness Center of Excellence.

C&CC: Please speak to your role as Command Surgeon, 82nd Airborne Division, U.S. Army and the role the 82nd plays in providing force readiness.

LTC Bimson: As the 82nd Airborne Division Command Surgeon, my primary responsibility is to serve as a special staff officer to the Division Commander ensuring that his Paratroopers are medically ready to deploy and that his medical teams are prepared to preserve his fighting force forward. The Division has some 900 AMEDD personnel that allows the Division to deploy our subordinate units with the required medical personnel to allow the commander to accomplish his/her mission in the most austere environment

imaginable. The Division does not contain organic surgical assets, but partners with our enabling Brigades at the Corps level and above to push surgical assets as far forward as possible.

The 82nd Airborne Division serves as the Global Response Force (GRF) that maintains the ability to conduct joint forcible entry through our airborne operations. The GRF operates on an outload timeline (N-hour sequence) that facilitates the deployment of an initial battalion within 18 hours and the remaining elements of a brigade combat team within 96 hours. Our non-organic surgical assets, Forward Surgical Teams (FST), are Airborne qualified as well and maintain this same timeline requirements allowing for the employment of damage control surgery. The FST may be employed at the

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C&CC: How has field medical care improved over recent years and what are some of the notable advances?

LTC Bimson: The last decade and a half has shown incredible improvements in survival rates compared to previous conflicts. Multiple contributors to this success have been identified and we continue to train to sustain these improvements. While these successes have been phenomenal, we must always remember that the very nature of the U.S. Army is that we maintain our expeditionary capabilities. A future battlefield may be much more complex than what we have experienced in the last decade plus of war. This battlefield may not be able to assure air superiority, may have limited resupply assurance and may exist in an environment where reliable communication lines may be degraded or denied. This environment may require our medical personnel to hold on to sicker patients for a longer period of time than we have ever been required to do during our recent conflicts.

MEDCOM has diligently been assessing our capabilities to function in the multi-domain battlefield and our ability to accomplish this mission. One solution that they have developed is Expeditionary Combat Medic Course. The 82nd Airborne Division had the honor of providing the Combat Medics for this inaugural class. This course looks to expand on the medical training our medics received during the Advanced Individual Training (AIT) following four lines of effort: Prolonged Field Care, Force Health Protection, Primary Care and a continued emphasis on Combat Casualty Care. Disease non-battle injuries continue to be the number one reason for evacuation off the battlefield. This trend has existed across the millennia as more Soldiers are removed from the fight by diseases than bullets and bombs. This class graduated this last December and we are now incorporating these medics back into our formation as enhanced medic providers and trainers of their colleagues.

C&CC: Can you discuss some educational capabilities that the combat medics are benefitting from today in preparing for the global battlefield?

LTC Bimson: MEDCOM's Expeditionary Combat Medic Course continues to grow and provide the capabilities needed for a future battlefield. We must continue to sustain our current medical force. We recognize that our AMEDD Center and School produces some of the best trained medics in the world. However, our medical expertise is not judged by our initial training, but the training we sustain. We inherently recognize that in medicine, repetitions matter. The more you do something, the better you get. These repetitions are accomplished in the field on training missions, at our Medical Simulation Training Centers and our MEDCOM Medical Treatment Facilities (MTFs). Our MTFs are our real-world Readiness Training Platforms. It is in our primary care clinics, emergency rooms and inpatient wards that our medics can get the repetitions they require to maintain their proficiencies needed downrange.



C&CC: In terms of increasing combat trauma survivability numbers, how is the 82nd helping propel this positive trend?

LTC Bimson: We also recognize that we have more work to do on lowering our mortality rates from potentially survivable wounds. Surviving a catastrophic combat injury doesn't start with a surgeon in a FST, but rather with the 20-year-old infantryman who witnesses the event. Over the last 18 months, the Division has focused on medical training as one of our eight areas of emphasis (our "82nd Eight"). This delineation has provided the command influence to allow Paratroopers to

undergo 40 hours of medical training. Our goal is to train 100% of our Paratroopers in those critical first responder requirements that will preserve life on the front line. This includes care under fire, control of major bleeding, tension pneumothorax, airway compromise, casualty evacuation and documentation of care delivered. As an Airborne unit, our Paratroopers receive additional training that focuses on injuries specific to the Airborne community and aspects of care on the drop zone. We continue to seek out new training methods, programs and trauma treatment techniques. Our special operations community has proven to be ideally situated to realize these advances in real time. This includes continually updating our equipment, utilizing the most up-to-date combat medicinal therapies and the use of fresh whole blood on the battlefield to name a few.

To keep up, the 82nd must continually adopt and adapt to those proven techniques that will bring our Paratroopers home to their friends and families. All of our training further instills trust and confidence in our Paratroopers as they jump into harm's way allowing them to know that they have a medically trained Paratrooper to their left and right.

C&CC: From the perspective of the past 16 years of combat operations, tell us about efforts that surgical units in the Army see as key to health and readiness?

MAJ Menendez: The key to surgical readiness on the battlefield is challenging and realistic team training, and reliable and quantifiable team evaluations. Under Objective T, our combat arms peers in Armor, Field Artillery, Aviation, and ADA units measure proficiency in the four broad categories that make up Objective T: Capital, Crew, and Platform; MET proficiency; Collective Live Fire Task Proficiency; and Training Days to Achieve T-1. This minimizes subjectivity and allows for a better comparison against a baseline, or from unit to unit. However, medical units only track individual weapon qualification, MET Proficiency, and Training Days to Achieve T1. The former has no impact on clinical morbidity and mortality, and the latter two have a large degree of subjectivity. This leaves a large gap in training readiness assessment and reporting for Forward Surgical Teams as Crew, Platform, and Collective Live Fire Task Proficiency (aka – treating real trauma patients as a team) are not measured; which limits the ability to evaluate the performance of these teams. However, Forward Surgical Teams can be evaluated as "platform centric units" akin to a 155mm Howitzer Battery. A Forward Surgical Team is analogous to a Field Artillery Battery in that the platform centric unit cannot perform its mission critical task in the absence





Medics of the 173rd Airborne Brigade load a patient who has received treatment at the battalion aide station onto a MEDEVAC helicopter from C/1-214 Aviation Brigade at Grafenwohr, Germany. (U.S. Army photo by Lt. Col. John Hall)

of the platform (Surgeon or 155mm Howitzer). In both cases, the crew can train drills without the platform, maneuver without live fire, and get a final assessment and validation in a realistic training environment with its platform. However, FSTs lack this level of objective quantification because medical crew and platform level

task are not measured, and as such there are missed training and evaluation opportunities at the crew, platform, and live fire level. Adopting this context (Platform Centric Unit) would allow for a new way to visualize and measure FSTs, and provides a potential solution in the FST training and evaluation gap. Assigned "crews" at the FSTs







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U.S. Army flight medics assigned to 82nd Combat Aviation Brigade ascend on hoist line with a patient during a simulated medical evacuation while supporting the 3rd Brigade Combat Team, 82nd Airborne Division during a joint training exercise at Fort Bragg. (U.S. Army photo by Sgt. Anthony Hewitt)

can train individual weapon certifications (as they do now), and then train and certify on objective and standardized “trauma battle drills.” Teams that reach a high level of proficiency at the crew battle drills can bring the PROFIS surgeon to refine TTPs (much like an Artillery gun crew can train the basics of laying the gun before they train with the Howitzer), before moving on to platform level certifications (Miami ATTC). Efforts to provide surgical teams with the opportunity to train together in realistic trauma situations outside of deployment is key to our success in combat.

C&CC: What is being done to integrate surgical capabilities far forward in the field, and how are Army surgical efforts touching this evolution to better care?

MAJ Menendez: At the tactical and operational levels, we are trying to reduce the time to a required surgical capability. Years of innovation allowed Army medicine to improve combat trauma survivability to 96%. But the future operating environment is unlikely to be a mirror of past conflicts, and maintaining that rate of survivability will require adaptations in how and where we provide surgical care. Limited air medical evacuation support and unreliable resupply operations will challenge our ability to move casualties to required surgical care. This will result in increased mortality for injured Soldiers that cannot be evacuated from the battalion aid station to surgical care. The 759th attempted to solve this problem of “reducing time to a required surgical capability” by splitting the team and moving them as far forward as the Battalion Aid Stations during training. In our most recent Joint Readiness Training Center experience (18-02), the supported unit (1-505PIR) had a 1% died of wounds rate, a reduction of over 60% from their previous experience nine months earlier. I don’t think that this is an isolated success, but rather proof that putting knowledge and capacity as far forward as

possible will be key in maintaining or improving combat mortality rates in the future operating environment.

C&CC: What factors are your team addressing in terms of care at point of injury, to evacuation, finally to surgical care, that are driving what the Army does to improve positive outcomes?

MAJ Menendez: Again, the key to improved combat survival in all phases of care is to push knowledge and capacity further forward. The 82nd Airborne Division is the trial Division for the Enhanced Combat Medic. This program is training our combat medics to bring increased capabilities to the battlefield. Training is focused on improving knowledge on how to identify and treat the leading causes of morbidity and mortality in combat. From how to identify and treat common medical problems that present to the aid station, to dealing with a trauma patient that cannot be evacuated to surgical care. To re-phrase what I said earlier to fit this model, instead of reducing time to a required surgical capability, we are training Medics to extend the time before the surgical capability is required.

C&CC: From a civilian medical partnership perspective, how are we applying critical advances to our force’s capabilities?

MAJ Menendez: I think that there is a fair amount of “cross pollination” that happens when it comes to trauma care between the military and our civilian partners. The military proved the safety and benefits of early tourniquet use in extremity trauma, and this is now becoming more common and accepted in the civilian pre-hospital trauma community. On the other hand, hospital techniques such as “REBOA” (a procedure to stop internal bleeding in the chest, abdomen or pelvis) are becoming more accepted in far forward military settings. The applicable benefit is training. Again, the key to success is repetition.

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FACILITATING NEXT-LEVEL HEALTHCARE

The U.S. Department of Defense has recently completed deployment of its Military Health System (MHS) GENESIS electronic records software suite at all initial fielding sites.

By PEO Defense Health Management Systems (DHMS)



Commanding officers of the military treatment facilities involved in the initial deployment of MHS GENESIS, the Department of Defense's new electronic health record pose for a commemorative photo with senior leadership during the MHS GENESIS Recognition Ceremony at Madigan Army Medical Center. The Pacific Northwest was selected as the initial deployment site for the new EHR, which has now been fielded at Fairchild Air Force Base, Naval Health Clinic Oak Harbor, Naval Hospital Bremerton and Madigan Army Medical Center. Pictured from left, Army Col. Michael Place, commander, Madigan Army Medical Center; Navy Vice Adm. Raquel Bono, director, Defense Health Agency; Air Force Col. Michaelle Guerrero, 92nd Medical Group at Fairchild Air Force Base, Washington; Stacy Cummings, program executive officer, Defense Healthcare Management System; Navy Capt. Jeffrey Bitterman, commanding officer, Naval Hospital Bremerton; Navy Capt. Christine Sears, commanding officer, Naval Health Clinic Oak Harbor; and Thomas McCaffery, acting assistant secretary of defense for Health Affairs. (DHA)

MHS GENESIS, DoD's single, integrated medical and dental electronic health record, successfully deployed at Naval Hospital Bremerton (NHB) and Madigan Army Medical Center (Madigan). These military treatment facilities represent the last of the initial fielding sites to go live in the Pacific Northwest. While preparing for deployment at NHB on September 23, 2017, the DoD Healthcare Management System Modernization Program Management Office, along with the Leidos Partnership for Defense Health, brought an additional host of

capabilities online for providers and beneficiaries, such as emergency and urgent care, additional inpatient care, and surgery.

On October 21, 2017, MHS GENESIS deployed at Madigan. "We achieved an exciting milestone for the Department of Defense and the Military Health System," said Stacy Cummings, Program Executive Officer, Program Executive Office, Defense Healthcare Management Systems. "Deployment at Madigan represents the fourth and final initial fielding site in the Pacific Northwest to start using

Deployment at Bremerton and Madigan

The Department of Defense's (DoD) new electronic health record, MHS GENESIS, deployed to Naval Hospital Bremerton and Madigan Army Medical Center on September 23 and October 21, 2017, respectively. The MHS GENESIS Patient Portal is a secure website that allows servicemembers, veterans, and their families 24/7 access to their electronic health record (EHR). In addition to viewing their health information, beneficiaries can also exchange secure messages with their care team, schedule medical and active duty dental appointments, and request prescription renewals.

The DoD Healthcare Management System Modernization Program Management Office recently completed deployment of the new EHR and the MHS GENESIS Patient Portal at Madigan Army Medical Center (Madigan). The system was previously deployed at Fairchild Air Force Base, Naval Health Clinic Oak Harbor, and Naval Hospital Bremerton.

During the deployment of MHS GENESIS at Madigan, the Program Executive Office, Defense Healthcare Management Systems and Madigan staff provided onsite support to assist beneficiaries with DS Logon registration and MHS GENESIS Patient Portal access. Staff members provided patients with information on key benefits of the MHS GENESIS Patient Portal and answered questions relating to system functionality.

For more info: health.mil/mhsgenesis

the current and future state of healthcare information technology, health information exchange (HIE), and the DoD's continued need to collaborate with external partners to ensure our electronic health record (EHR) capabilities serve the unique needs of our servicemembers, veterans, and their families. The session also included updates on the Departments' EHR modernizations, interoperability progress, and evolving standards to enable HIE.

Genevieve Morris, Principal Deputy National Coordinator for Health Information Technology, shared ONC progress and moderated a Workforce Development panel discussion with representatives from the DoD, VA, and the Healthcare Information and Management Systems Society. Dr. Karen Guice, former Principal Deputy Assistant Secretary of Defense for Health Affairs, focused the discussion on health technology barriers and potential market disrupters. Stacy Cummings, PEO DHMS, and Dr. Lauren Thompson, Director, DoD/VA IPO, emphasized the importance of expanding collaborative relationships and working together to advance the interoperability capabilities of today and solve the technological challenges of tomorrow.

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MHS GENESIS. As the Army's second largest treatment facility, with more than 100,000 beneficiaries receiving care at Madigan, we have a responsibility to provide the best possible solution. Our team is working with providers at Madigan to deliver on that responsibility," said Cummings.


Following the deployment of MHS GENESIS, Cummings joined leadership from the DoD, representatives from the Surgeons General offices, and the Defense Health Agency for the MHS GENESIS Go-Live Recognition Ceremony on November 15. The ceremony was hosted at Madigan to commemorate the successful deployment of MHS GENESIS at all four of the initial fielding sites in the Pacific Northwest. More than 150 guests attended the ceremony. Thomas McCaffery, acting assistant secretary of defense for health affairs, provided the keynote address. During his remarks, McCaffery underscored the collective commitment to the mission and its importance to military readiness and the nation's defense. The DoD plans to fully deploy MHS GENESIS to 9.4 million beneficiaries and 205,000 medical personnel and staff by 2022.

"We achieved an exciting milestone for the Department of Defense and the Military Health System," remarked Cummings.

On-Boarding Health Information Exchange


This past November, the Department of Defense (DoD)/Department of Veterans Affairs (VA) Interagency Program Office (IPO) held the DoD/VA Industry Interoperability Roundtable, "Care Anywhere: Bridging the Gap between Care and Quality." The semi-annual event featured speakers from the DoD, VA, the Office of the National Coordinator for Health Information Technology (ONC), and industry organizations. Highlights from the event included a discussion on

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TAPPING ADVANCES IN SPINAL CORD CARE

The Veterans Health Administration (VHA) is advancing spinal cord injury (SCI)-related care for U.S. servicemembers injured in Operations Iraqi Freedom and Enduring Freedom.

By Steven E. Braverman, M.D., Col. US Army Ret., Director, Edward Hines Jr. VA Hospital



SSG Sawlsville in his track chair enjoying his participation in paintball. The specialized chair can stand up, and will go through mud, snow and water. (Hines VA Hospital)

One night in 2007, two soldiers in a U.S. Army Humvee were making their way to an observation post somewhere under the dark skies of Iraq. The driver intentionally had the vehicle's headlights turned off and was using night vision goggles for safety. Neither the driver nor passenger saw it, but they both knew immediately they had struck an IED, or improvised explosive device. Left with a skull fracture, broken teeth, and a vertebrae in his spine that burst, Staff Sergeant Brian Sawlsville woke up two weeks later, his life forever changed. The 22-year-old was paralyzed from the waist down and suffered a traumatic brain injury.

Since the beginning of the wars in Afghanistan and Iraq in 2001, more than 1.9 million U.S. military personnel have been deployed as part of either Operation Iraqi Freedom or Operation Enduring Freedom. Moreover, these actions make up the longest sustained U.S. military operation since the Vietnam War.

With advances in body armor and emergency medical care in the war zone, the Died of Wounds (DOW) rate for U.S. servicemembers is the smallest in the history of warfare. Consequently, this has resulted in more servicemembers returning home with severe combat-related injuries. We categorize these injuries into treatment groups like Polytrauma, Traumatic Brain Injury (TBI), Spinal Cord Injury (SCI), amputation, burns, and post-traumatic stress disorder (PTSD) and other mental health issues. The VHA within the Department of Veterans Affairs (VA) is responsible for providing care to these veterans.

The VHA is the nation's largest health care system provider of Spinal Cord Injuries and/or Disorders treatment and rehabilitation, caring for more than 26,000 Veterans with SCI/D. The Edward Hines, Jr. VA Hospital is a 483-bed comprehensive tertiary care hospital in the Chicago area that has been providing specialty care to veterans with SCI since 1991. In 2005, Hines opened its 58,000-square foot Spinal Cord Injury/Disorder Rehabilitation Center that serves male and female patients from an

eight-state area through a hub and spokes system of care for eligible veterans.

Polytrauma and TBI

Hines is a Polytrauma Network Site that has both local and regional responsibilities to treat veterans like SSG Sawlsville, who suffered injuries to his spine and his brain. Many veterans returning from Iraq and Afghanistan suffer from polytrauma. For categorization purposes, a polytrauma patient is defined as a patient having two or more severe injuries to different parts of the body, resulting in physical, cognitive, psychological, or psychosocial impairments and functional disabilities. Patients with spinal cord injuries often suffer from polytrauma and benefit from a combined comprehensive and coordinated systems of care.

In 2005, VHA established the Polytrauma/Traumatic Brain Injury (TBI) Program nationally to serve combat veterans through such a comprehensive and coordinated system. With more than 375,000 Traumatic Brain Injuries diagnosed in U.S. servicemembers since 2001, TBI is the most commonly diagnosed functionally limiting comorbidity with SCI. Every post 9/11 veteran with SCI is now routinely screened for TBI in order to identify those who need this multifaceted polytrauma care. In the last year alone, Hines screened more than 4,000 veterans to ensure their healthcare needs were met across the continuum of care. The Polytrauma/TBI Program is a tiered and integrated system comprised of rehabilitation centers, network sites, clinical support teams and points of contact. A primary goal of the Polytrauma/TBI Program is to build hope for veterans as they reintegrate into their home communities. Our polytrauma team addresses the medical, physical, cognitive, and psychosocial needs of each veteran to provide the individualized care they need. Hines offers veterans a collaboration of rehabilitation specialists from different disciplines who participate in the comprehensive and individualized evaluation and treatment.

Some of the associated disciplines in our polytrauma program include:

- Comprehensive Amputation Care
- Low Vision Services
- Assistive Technology
- Driver's Rehabilitation
- Vocational Rehabilitation
- Family Services

Hines developed a dynamic support group that has guest speakers. The Family Empowerment Network provides a space for



Army Veteran John Guest works with therapist Bill Most at the Hines SCI Rehabilitation Center. (Hines VA Hospital)



Dr. Steven E. Braverman

sharing information to veterans and their families on areas of interest selected by them. Hines is a national training/education center with Polytrauma fellows in mental health, speech therapy, audiology, and blind rehab.

Amyotrophic Lateral Sclerosis

Our advances in treatment capability for SCI allowed us to apply similar gains in rehabilitation of motor diseases. One key area is Amyotrophic Lateral Sclerosis (ALS). In 2014, Hines formed an ALS interdisciplinary treatment team to meet the demands of an increasing population with this fatal disorder that impacts veterans at a higher rate than the general population.

The interdisciplinary ALS team is comprehensive. It includes a lead neurologist, a nurse practitioner, two speech pathologists, a social worker, an occupational therapist, a physical therapist, a dietitian, a palliative care social worker and a pulmonologist. Studies have shown that patients followed by these teams live longer and their quality of life is better.

This team also works with partners to provide for the wide variety of needs ALS patients can have. Partners include palliative care specialists and the local chapters for the ALS Association and the Les Turner Foundation.

The interdisciplinary clinic for ALS currently serves more than 60 veterans with varying degrees of disease progression. Clinical treatment may include medication management, physical and occupational therapy and providing custom wheelchairs, adaptive driving equipment and assistance with modifications to their homes – structural and technological. The team can also provide caregiver support and counsel patients, families and caregivers regarding optimal medical care as the disease progresses.



RECREATION THERAPY

Hines Recreation Therapy provides a variety of services to veterans with SCI/D. Whether a veteran is working to improve his or her physical abilities or strengthen their interpersonal skills, there's a recreational activity that can help. Other activities help build confidence or manage stress. Simply put, rec therapy helps veterans with SCI/D learn to re-engage in life.

Our recreational therapists develop individualized goals and interventions for each veteran participating in the therapy program. The various programs include adaptive sports, music therapy, art therapy, yoga, leisure education, community reintegration activities, meditation, cognitive enhancement activities, reality orientation/sensory stimulation activities, horticulture, arts and crafts, social programs and the community referral program.

Adaptive sports continue to be a breakthrough program for veterans with SCI/D, as they provide an outlet for these men and women to regain purpose in their lives. Recreational therapists serve as committee members and coaches for national events. They also coach practice and organize travel for athletes who need transportation to and from the events.

National events for veterans include:

- National Veterans Winter Sports Clinic
- National Veterans Golden Age Games
- National Veterans Wheelchair Games
- National Veterans Summer Sports Clinic

In addition to national events for adaptive sports, Hines recreational therapists assist veterans with SCI/D in the participation in two annual creative arts festivals. Therapists will help veterans who enter the Hines Creative Arts Festival, as well as those who are selected to move on to the National Veterans Creative Arts Festival.

A key component of this ALS care is a strong support group set up to provide medical care and supportive therapy to the patients and their families and caregivers. The ALS support group meets at the hospital twice a month, and in the last fiscal year, had a 20 percent increase in veteran participation. It's not surprising to see these positive shifts with the measurable increases in patient autonomy in decision-making, functional independence, increased utilization of augmentative and alternative communication devices, and overall increases in knowledge base about ALS.

Caregiver Support

Because there's no place like home, the Hines SCI/D team has developed a comprehensive caregiver support program to help as many veterans as possible remain safely in their own homes. The program's three pillars are education, training and support.

Our social workers are part of an interdisciplinary team that performs an annual screening of each caregiver to ensure they have the tools for the job. The team also has identified specific referrals and supports to be used when the caregiver is under excessive stress or burden. Caregivers can utilize medical and assistive home health care services as necessary and our veteran caregivers have access to an annual benefit of up to 30 calendar days of respite care provided in the home or in the SCI Unit.

Additional support services available at Hines include:

Home Based Primary Care (HBPC) is offered by a trained team of clinical staff. The services focus on helping the veteran and caregiver overcome medical or psychological challenges being faced in the home environment.

Respite Care is intended to provide support and relief for the caregiver who provides care to the Veteran in their home environment. The care extended for a total of 30 calendar days and based on the individualized needs of the veteran with SCI/D respite services may also be provided in the home or a nursing facility.

Fisher House is a resource offered to family members or caregivers of veterans admitted to SCI/D for acute rehabilitation or other inpatient stay. Amenities at the Fisher House include private rooms, a common kitchen, living & dining rooms, and laundry facilities provided at no charge for stay and the Fisher House is located on campus.

Program of Comprehensive Assistance for Family Caregivers remains available for caregivers of veterans who sustained a serious injury in the line of duty on or after September 11, 2001, and who remain in need of personal caregiving services.

Assistive Technology

Helping Veterans with SCI increase their independence and improve the quality of their lives is essential to what we do. In 2010, Hines instituted an Assistive Technology Lab, providing devices to assist with communication, environmental control, and the use of personal technology. Since then, we've seen a 60% growth in assistive technology procedures, and we've served more than 200 veterans in the past three years.

Using a multidisciplinary team, we introduce veterans to equipment that maximizes functional independence. We train them and evaluate what works for their specific needs and preferences.

While options in assistive technology are wide and varied, we know that being able to communicate with their friends, family and providers is a priority for most veterans. We offer devices that allow the veteran to communicate using augmented and alternative communication. For patients with progressive conditions such as ALS, we can record personalized messages that will later be used to customize their device, making future communications easier and more personal.

The Assistive Technology Lab also provides environmental control units and home automation systems. These devices allow



SSG Sawlsville with his fiancée Krista and her mother Nancy while standing in his ReWalk device. (Hines VA Hospital)

for alternative access to hospital beds, call chimes, lights, fans, televisions, and doors. We also provide tools for veterans to easily operate personal electronics including their cell phones, computers, tablets and remote controls.

The varied ways our veterans have learned to communicate, control their environment and access personal electronics are impressive. Whether using a limb, their mouth, or even their toes, our veterans work with qualified therapists to find the best assistive technology experience to help them become as independent as possible, while promoting social participation and health management.

Exoskeleton Training Program

SSG Sawlsville's life took another dramatic turn in the summer of 2017 when he was provided a ReWalk from Hines. Like other therapies, SSG Sawlsville is taking a measured, step-wise approach to the ReWalk, learning to walk while eventually hoping to run a 5K with assistance from the device.

VHA has embraced power-assisted walking devices for both research and patient use since 2014 and ReWalk is the first exoskeleton to receive FDA clearance for personal and rehabilitation use in the United States.

Hines has been an early adopter of this assistive technology that has been truly life changing for each of the 12 veterans we've introduced to the ReWalk and Exo exoskeleton devices. These wearable robotic exoskeletons provide powered hip and knee motion to enable people with SCI to stand upright, walk and turn.

Our SCI providers work with VA patients like SSG Sawlsville, and for those who meet specific criteria, we write a prescription that allows veterans to use these computer-assisted walking devices to regain some of their independence and other improvements. SSG Sawlsville, for example, has experienced improvements in his overall mental health. He recently became engaged and has a full-time job. He gives at least some of the credit to the device and how it has shaped his outlook on life.

These devices contain independently controlled bilateral hip and knee-joint motors, rechargeable battery and a computerized control system carried on a backpack. Over the years, these devices have become lighter and more portable, with four separate devices approved by FDA.

In addition to SSG Sawlsville, the Hines SCI/D team has successfully helped to screen, train and issue two other devices for veterans to use in their homes and at least a dozen veterans to experience using the device while at Hines.

Hines also proudly published the first report of a veteran with multiple sclerosis showing improvement in gait, balance, over-ground mobility and overall satisfaction with life measures from the use of an exoskeleton device. The Hines SCI/D Service has utilized both the ReWalk and the Exo powered devices.

The Future of SCI Care

VA research on SCI focuses on returning motor and sensory function to veterans with these injuries. Areas of focus include neural engineering to design solutions to neurological limitations and dysfunction; wheelchair and other adaptive technology; treatment of the medical complications of SCI; and new rehabilitation methods and outcomes.

VA researchers are also working in the field of regenerative medicine, learning how to restore tissue and organ function, including spinal cord function. Researchers are using a variety of tools to change the ways wounds heal in humans. This research just may make it possible for veterans like SSG Sawlsville, who today rely on assistive technology to help overcome SCI/D, to see their damaged organs and tissues repair and regenerate themselves.

A promotional banner for VA Healthcare. The top half features a close-up of a stethoscope over an American flag. The text "VA Healthcare" is prominently displayed in green and white. Below it, the dates "May 14 - 16, 2018" and the location "2018 Washington D.C." are shown. The middle section has a dark green background with white text: "Building Partnerships. Protecting Veterans. Advancing Healthcare." The bottom section has a green background with white text: "Combat & Casualty Members: Use Code VAHC18_CC for 20% Off!". At the very bottom, the website "www.VeteransAffairsHealthcare.iqpc.com" is listed.

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MITIGATING THORACIC TRAUMA THROUGH PROACTIVE CARE

For over 35 years, H&H Medical Corporation has sought ways to design and engineer novel, cost-effective solutions to military customers. Since 2001, H&H Medical has been a leader in the development of innovative products to reduce preventable death from severe injuries, with point of injury care products extending throughout U.S. military trauma programs.

By Paul X. Harder, President

H&H Medical became known in the military medical community for innovated products packed especially for austere environments. Our unique processes focus on creating custom packaging solutions and vacuum packing products such as the H-Bandage compression dressing, the Bolin Chest Seal, and the PriMed Compressed Gauze. These capabilities have made H&H Medical products the standard in U.S. military individual first aid kits.

Innovations in Pneumothorax Care

In recent years, H&H Medical has deployed two new products to address needs in treating tension pneumothorax conditions due to chest injuries. These novel approaches give military medical professionals advanced methods for responding to injuries that may result in potentially life-threatening conditions.

The first product introduced is the H&H Enhanced Pneumothorax Needle (EPN). The EPN overcomes the shortfalls of the flexible catheter of a standard pneumothorax needle. The catheter was never designed for this purpose and, as a IV catheter, it is designed to become soft and pliable in the body. This fact makes it only a temporary solution for a tension pneumothorax situation, one which fails shortly after insertion requiring multiple needles with an increase in the likelihood of misplacement and damage to tissues. The EPN does not have a catheter but rather is a solid 3.25" surgical steel needle with



H*VENT Chest Seal



Enhanced Pneumothorax Needle (EPN)

a veress safety tip. The interior of the needle measures 14ga, providing a release path for air trapped within the chest cavity hence relieving pneumothorax (air in the chest) pressure. The EPN displays the depth of the needle inside the chest as well as an indicator in the see-through housing showing when the safety tip retracts or returns in place. The cap is also a luer connector to allow for the rapid removal of air using a manual suction device (e.g. syringe) or the clearing of fluids from the needle (not recommended for use with a hemothorax). In

testing, the EPN proved to be as effective as current needle technology in time to recover and excelled in treatment of test subjects experiencing pulseless electrical activity (PEA) over current needle technology.

Another product recently introduced by H&H Medical is the H*VENT vented chest dressing. Like our world-class Bolin Chest Seal, the H*VENT was designed to work to relieve pressure from an open chest wound due to pneumothorax. However, unlike the Bolin Chest Seal, the H*VENT is also designed to allow blood or bodily fluid to drain out of the chest wound through the seal, as in the case of a hemothorax. In designing this new chest seal, H&H Medical created the H*VENT with several innovations not seen with other vented chest dressings. First, the

H*VENT comes with a unique multi-directional vented dressing that allows fluids to drain with gravity. The seal comes with six channels to significantly reduce the chance of occlusion. The design of the open vent also makes it easy to visually monitor.

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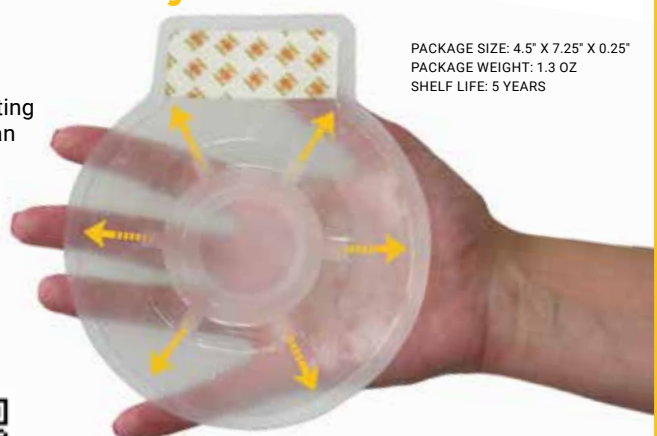
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Disrupting Viral Pathways

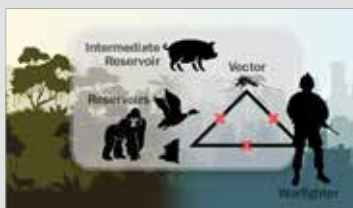
A new DARPA program called Preventing Emerging Pathogenic Threats, or PREEMPT, seeks to support military readiness by going after new viral infectious diseases at the source, animal reservoirs—the species in which a pathogen lives, multiplies, and potentially evolves into a strain that can threaten humans. PREEMPT aims to advance understanding of viruses and their interaction with animals, insects, and humans, and deliver new, proactive interventions to reduce the risk from emerging and reemerging pathogens.

“Despite global biosurveillance efforts, viral outbreaks continue to outpace medical preparedness. That means that in volunteering to be the first ones into harm’s way, our Servicemembers can quite literally be among the first people exposed to emerging infectious diseases,” said Jim Gimlett, the PREEMPT program manager. “DARPA wants to reorient preparedness efforts to make them more proactive, so that instead of only modeling the trajectory of an epidemic as it spreads from human to human, we contain and suppress diseases in the animal species in which they originate before they can make a jump into people.”

Two-pronged Approach

PREEMPT will have two technical thrusts: development of multiscale models and test beds to quantify the imminent emergence and reemergence of human pathogens; and development of new, scalable approaches to preventing pathogen spillover and transmission from animals and vectors into humans.

Understanding how viruses evolve within a species will be a core area of research. That evolutionary process contains natural bottlenecks that could be exploited to impede dangerous



DARPA's Preventing Emerging Pathogenic Threats program seeks to prevent cross-species viral jumps by predicting evolution and transmission pathways and proactively intervening to prevent the jump to humans. (DARPA)

mutations. PREEMPT will seek to identify these opportunities for intervention by modeling the factors that enable species jump. Researchers on the program will be required to conduct field surveillance of animal and insect species in high-risk areas around the world; generate data in lab testing and sequence viruses as they evolve; analyze the jump risk by weighing factors such as past known jump events, ecology, seasonal variants, and geospatial data; and, finally, validate models using simulated natural environments.

New proactive interventions will center on methods for disarming a virus before it can make a jump across species. PREEMPT aims to prevent transmission of virus from a reservoir species direct to humans, from a reservoir species to traditional vectors, such as mosquitoes, that spread disease, and from a reservoir species to a species intermediate to humans—for example, from bats to pigs.

Successful interventions will be tailored to anticipated threats. For instance, if a single mutation is identified by models as high risk, an intervention might seek to prevent its entry into a new species by removing that specific mutation from the reservoir. Alternatively, if multiple potential threats are identified, an intervention could involve treating the entire animal reservoir to reduce viral load using tools such as antivirals, vaccines, and interfering particles. Other forms of intervention might involve new approaches to suppressing the transmission of specific viruses by insect vectors. In all cases, researchers will need to develop scalable methods that can be readily deployed even in remote locations.

More info: darpa.mil

Clotting Capability Goes Commercial

Z-Medica, LLC, a leading developer and marketer of hemostatic devices, has announced that QuikClot Control+® is now commercially available.

Cleared by the U.S. Food and Drug Administration in June of 2017 under the de novo classification process, QuikClot Control+ is the first and only hemostatic dressing cleared for temporary control of internal organ space bleeding for patients displaying class III or class IV bleeding.

“Full commercial availability of QuikClot Control+ adds an additional life-saving tool to the arsenal of Z-Medica products that surgeons can use to help save lives and fill the



(Z-Medica QuikClot Control+®)

unmet need of hospitals across the country,” says Z-Medica President and CEO Stephen J. Fanning. “Uncontrolled bleeding continues to be a major cause of preventable deaths. Devices like QuikClot Control+ can improve hemorrhage control, potentially saving lives and reducing healthcare costs.”

QuikClot Control+ is indicated for temporary control of internal organ space bleeding for patients displaying class III or class IV bleeding. It may also be used to control severely bleeding wounds such as surgical wounds and traumatic injuries.

More info: z-medica.com

Mobile Vital Signs Monitoring

ZOLL® Medical Corporation, an Asahi Kasei Group Company manufacturing medical devices and related software solutions, has announced the receipt of a sole-source contract from the Defense Logistics Agency to supply Propaq® M deployable vital signs monitors to the U.S. Air Force and the U.S. Army.

The Propaq M, selected as the joint "Product of Choice," is an advanced vital signs transport monitor, with capabilities far beyond the Propaq Encore 206, which has been the tried and trusted vital signs monitor serving the U.S. military over the last 25 years.

The Propaq M was designed specifically for the rigors of military operations in the most austere environments. The Propaq M can be equipped with an integrated defibrillator and pacer for critical lifesaving mission readiness. This configuration, known as the Propaq MD, eliminates the need to carry a separate monitor and defibrillator



(Zoll Propaq® M)

to improve operational efficiencies. During the competitive evaluation period, military subject matter experts stressed the importance of printing the 12-lead ECG report and related patient data directly from the vital signs monitor. The Propaq M is the only airworthy vital signs monitor that is available with an integrated printer, thereby allowing the services to reduce size, weight, and cube by eliminating the need to carry a separate standalone printer.

"We are very pleased to see the continued commitment to the ZOLL Propaq platform," said A. Ernest Whiton, President of ZOLL's global Resuscitation division. "This recent award demonstrates the DoD's confidence in ZOLL's monitoring and monitoring/defibrillation technology that is currently deployed throughout the services today."

More info: zoll.com



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SEEING WHAT THE EYE CANNOT

A new hand-held diagnostic device helps determine the presence of intracranial bleeding in victims of head trauma that may otherwise go undiagnosed.

By Edward Lundquist, C&CC Correspondent



The Infrascanner uses near-infrared spectroscopy, which enables comparison of differential light absorption associated with injured versus non-injured parts of brain. (Infrascan, Inc)

Time is of the essence for trauma patients who must receive immediate and appropriate care during that first “golden hour.” This is especially true for traumatic head injuries, which are a leading cause of death or permanent disability.

With battlefield casualties, the severity of shock or trauma is not always obvious to the patient or the observer. Bleeding inside the head, called intracranial hematomas, wouldn't necessarily appear to a medic or fellow soldier. Externally there might be no sign of a critical injury until the bleeding starts to compress the brain. The only way to tell if there is internal bleeding inside the brain is with a computerized tomography, better known as a computed tomography—or CT—scan, which requires a very expensive medical device that takes up an entire room.

Such a device is not likely to be found near the battlefield, and might only be available following a time-consuming evacuation to

Infrascanner device fits easily in one hand. (Infrascan, Inc)



a hospital or clinic. But now a handheld diagnostic device called the Infrascanner can know what the eye can't see.

Harnessing the Power of Infrared

Developed by a small company to meet an urgent military requirement, the Infrascanner, a product of InfraScan Inc., of Philadelphia, Pa., was a technology licensed to address a challenge posed as a Department of the Navy Small Business Innovative Research (SBIR) topic.

“We were a small team of engineers trying to start a company. When we learned about SBIR, it was a big motivator to get incorporated so we could take advantage of it,” said Dr. Baruch Ben-Dor, president and CEO of InfraScan Inc., in Philadelphia. “We saw the SBIR topic, and our technology was very close to what the Navy was looking for.”

The solution is actually quite simple. Infrascanner uses near-infrared spectroscopy, which can compare the differential light absorption associated with the injured versus the non-injured parts of brain.

"It's not as accurate as a CT scan," said Ben-Dor. "But it has over 90 percent sensitivity, which means it almost always shows the presence of bleeding if it is occurring. It has very good specificity, too, which means it rarely has false alarms."

To meet the requirement, Ben-Dor said InfraScan licensed the basic technology from Dr. Britton Chance of the University of Pennsylvania and Dr. Claudia Robertson, a leading neurosurgeon of the Baylor College of Medicine. "We looked at the technology, and saw a good concept that was ready for commercialization."

By focusing on the exact requirement specified in the topic and leveraging the existing technological concept, InfraScan was able to adapt it, kept it simple, and get the device ready for testing sooner.

"Our business model is to build a system, field it, and then make it better based on what the users tells us. We're still working on improvements to existing systems, and making it more affordable. Our current product is generation 6. We're giving it new functions and helping the medic solve more problems," said Ben-Dor.

Evolving to Address Condition Progression

According to Ben-Dor, new versions can determine if the brain is not getting enough oxygen or there is a swelling because of water inflow to the brain as well as hemorrhagic shock. "But we still want the device to be very simple," he said. "We're trying to provide a device that is focused on the need of the user, not the technology. Our technology is not super sophisticated, but from the very beginning, from our Phase I to delivery to the user, what we did addressed exactly what the user needed. This is about the needs of the field medical personnel."

The Infrascanner was deployed with Marines in Afghanistan where they were able to use the system to determine if a medevac was necessary. "We were able to determine that in 15 traumatic head injury cases there were no brain bleeds, thus evacuating using a vehicle and eliminating the need to send a helicopter to take the patient to a hospital," Ben-Dor said. "So we saved 15 helicopter flights, and allowed those aircraft to be used for more urgent situations."

"Before the Infrascanner, the only way we could assess brain injuries in the field was by completing a symptom questionnaire," said John Philpott, a medical team, engineer with Marine Corps Systems Command.

"Those Marines who we can determine are not suffering from a brain hematoma can get back to the action sooner," Philpott said.

However, the device is a life-saver. In the case of an Afghan boy who was injured by an IED, his parents brought him to the Marines with a small head laceration. But the Infrascanner found brain bleed. The boy was evacuated to a surgical hospital and his life was saved.

Established in the Field

Infrascanner is now a program of record and part of Marine Battalion Aid Station diagnostic toolkits for operational use. The Army has also purchased a number of devices, as well. The U.S. Army



Chief Hospital Corpsman Jared Anderson uses an Infrascanner to assess Master Gunnery Sgt. Maceo Mathis for intracranial hematomas-- or bleeding within the skull-- aboard Marine Corps Base Quantico, Va. The Infrascanner is a portable, medical diagnostic device that provides early detection of intracranial hematomas in the field, potentially saving lives and improving casualty care and recovery. Infrascanners are available for medical personnel to use at battalion aid stations across the Corps. (U.S. Marine Corps photo by Ashley Calingo)



U.S. Army Spc. Sung Seo, 6th Battalion, 52nd Air Defense Artillery medical NCO in charge, treats a simulated head wound of U.S. Air Force Senior Airman Jackson Sullivan, 51st Security Forces Squadron response force leader, during the 35th Air Defense Artillery Brigade Expert Field Medical Badge preliminary competition at Osan Air Base, Republic of Korea. During the competition, Seo earned the top performer slot over the other 14 participants. (U.S. Air Force photo by Staff Sgt. Alex Fox Echols III)



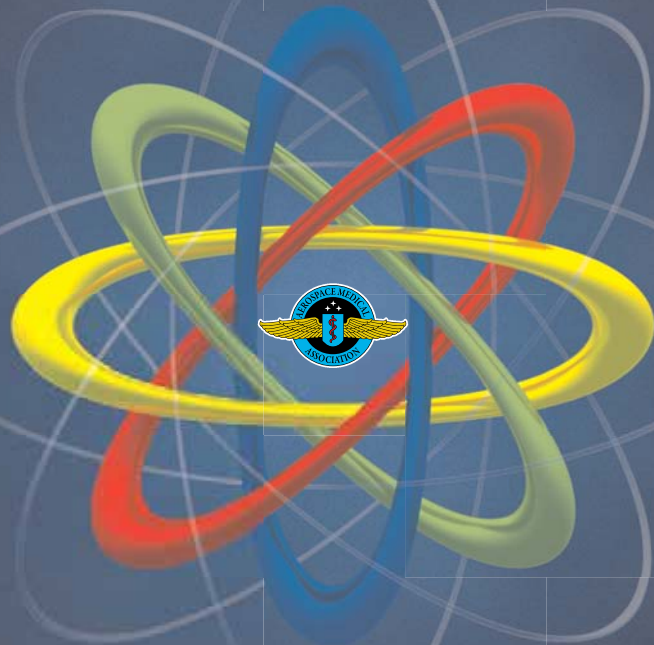
Infrascanner comes in a portable carrying case. (Infrascan, Inc)

Medical Research Acquisition Activity issued a \$2.9 million contract in September 2017 to Infrascan for a "Point of Injury Device to Measure and Monitor Physiological Parameters Relevant to Moderate-Severe Traumatic Brain Injury."

"The Army has asked us to develop a more compact version of the system," Ben-Dor said.

In 2016, data indicated that approximately one warfighter sustained a moderate or severe brain injury for every five casualties on the battlefield, according to Brian Dacanay, a biomedical engineer and product manager at the U.S. Army Medical Materiel Agency at Fort Detrick, Md. "Early intervention is essential because of irreversible medical complications that may ensue due to the severity of brain injury," said Dacanay. "The technologies awarded for further development have the potential to save lives and improve future quality of life for these injured warfighters."

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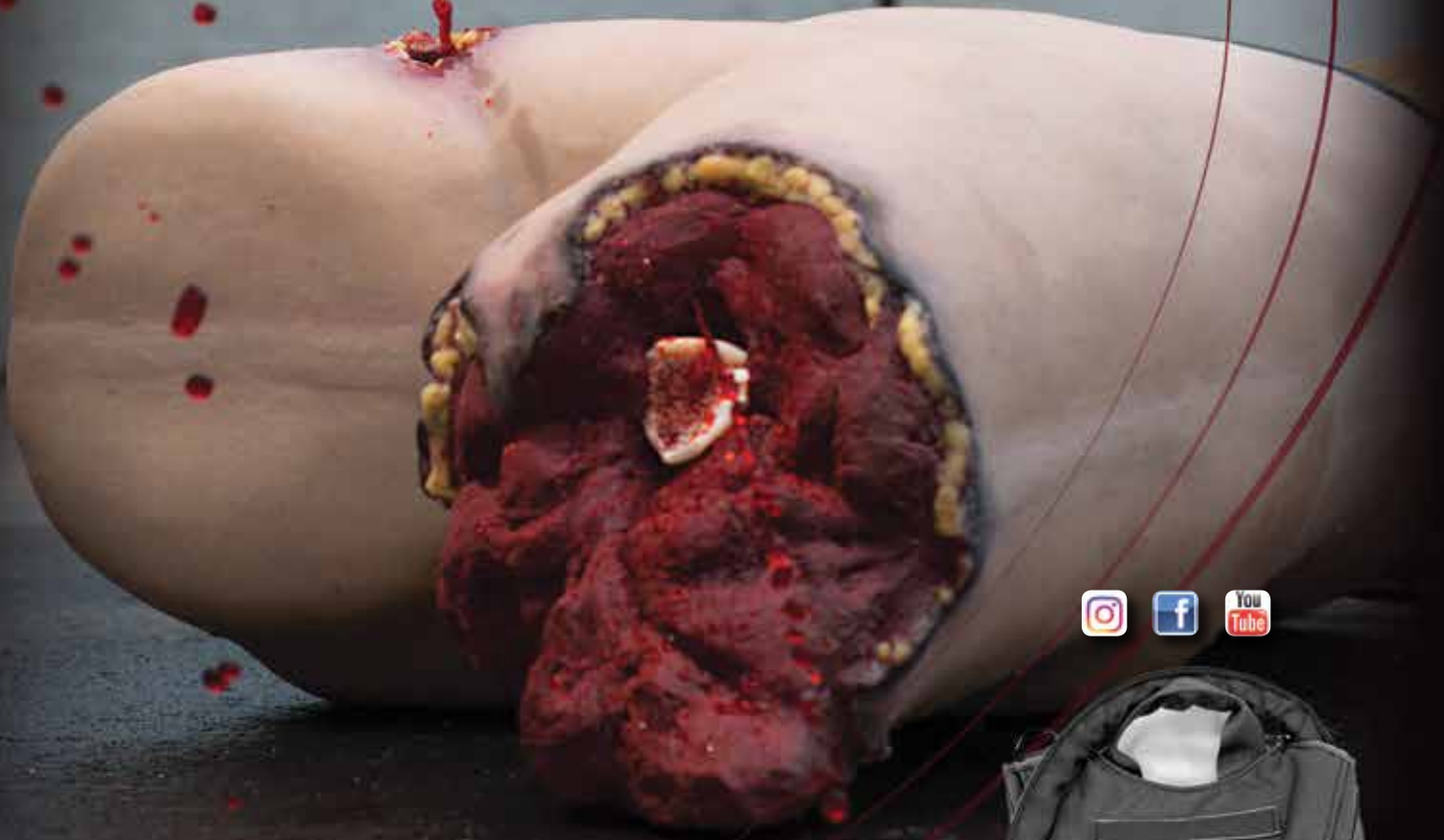


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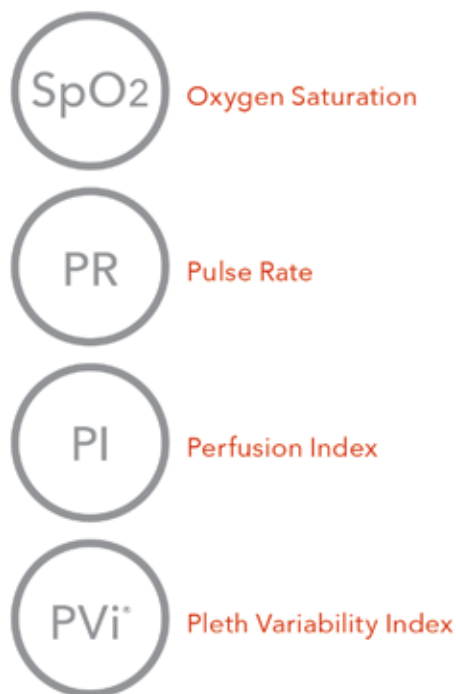
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