The Point

A newsletter for and about the people of the
U.S. Army Medical Research and Materiel Command
Spring 2011

National Panel Addresses a Major Cause of Preventable Battlefield Deaths

Many lives have been saved since the U.S. military examined the number of battlefield deaths due to blood loss and added modern tourniquets to all medical kits in 2005. The military recently convened a national panel to see if it could do the same for another preventable cause of death on the battlefield—airway obstruction.

To find out what more could be done to reduce the number of deaths from airway injuries, the U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center and Combat Casualty Care Research Program organized a national review in November. TATRC Trauma Portfolio manager Dr. Thomas Knuth and CCCRP director Col. Dallas Hack chaired the meeting. They invited field medics, those who train them, medical and technology experts from all branches of the military and civilian institutions, and the investigators on several projects the military is funding related to field airway management.

One project presented at TATRC's field airway management review this fall was a universal cricothyrotomy device. This can be operated safely with one hand to surgically create an open airway. One button extends the depth-limited scalpel blade, and another button retracts the blade and extends hooks to hold the airway open.

Photo courtesy of Pyng Medical Corporation

Said Knuth, "We brought everyone together to compare what we're researching with what is currently available and what is truly needed. TATRC regularly organizes national panels such as this to shape federally funded research throughout the country to ensure it most effectively improves the medical care of our Warfighters."

While TATRC focuses on technology, just as important is the collaboration and results-focused perspective it brings. "TATRC's role is to steward taxpayer money responsibly, to identify research gaps and redundancies so we can move toward evidence-based solutions to save lives," Knuth noted.

A major need identified by the group was a simple, safe way to surgically create an open airway on the battlefield, a procedure called a cricothyrotomy. This is particularly important due to the nature of airway injury deaths from Operation Enduring Freedom/Operation Iraqi Freedom, most of which resulted from direct injuries, usually due to gunshots to the face or neck. According to emergency physician Lt. Col. Robert Mabry, who directs the Pre Hospital Care Division of the Joint Trauma System, one-third of battlefield cricothyrotomies fail.

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Better equipment is one key. Medics currently carry an emergency cricothyrotomy kit that includes five separate pieces. To simplify the kit, Pyng Medical Corporation has developed a universal cricothyrotomy device that incorporates the scalpel and tissue spreading hooks into one unit. The design protects from cutting too deeply or letting go of the opening before inserting a breathing tube.

Other critical needs revolve around training. While the first responder medic in the field is not often called upon to perform a cricothyrotomy, he or she has to know when to do one and how. Yet it is difficult to provide adequate decision-making and technical skills for this life or death operation in the current one-week predeployment trauma course. In addition, there is currently no standard method of assessing whether an individual has gained the skills to perform the procedure.

"Medical modeling and simulation is a major TATRC focus particularly for education in trauma and emergency medicine," said TATRC assistant director Col. Ron Poropatich. "We could support projects that develop creative ways for medics to practice enough to gain the necessary judgment and technical skills."

Added Knuth, "We can incorporate ways to measure the outcomes of the training as well so we can assess whether someone is proficient."

The panel explored demonstrations of new training technologies, including the National Capital Area Medical Simulation Center's virtual cricothyrotomy teaching tool, which uses three-dimensional glasses and two joystick "hands" to enable users to see and feel their way through a simulated airway surgery. The SimCenter is part of the Uniformed Services University of the Health Sciences.

Most airway management procedures are performed in or en route to aid stations and hospitals. This is where the expert panel suggested the greatest improvement in clinical outcomes could be realized through harnessing enhanced technologies such as video laryngoscopy to visualize airways and telemedicine to provide access to expert guidance from military anesthesiologists.

According to Maj. (Dr.) Christopher V. Maani, chief of anesthesia and principal investigator at the U.S. Army Institute of Surgical Research and Army Burn Center, despite the current technology, intubation errors occurred in 23 percent of attempts during a prospective observational study of almost 2,000 civilian prehospital intubations (Wang et al). The need for refining airway management was further shown by a study of 492 trauma patients intubated in the prehospital setting without the use of anesthesia or muscle relaxants where only one patient survived (Lockey, et al.).

The panelists reviewed several projects aimed at bringing new technology to airway procedures, including an Android-based wireless telemedicine system being developed by the University of Nebraska, and a portable

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airway system from AI Medical Devices that replaces an entire cart full of equipment with a universal handle that can hold a series of interchangeable tools.

Said Knuth, "The way forward is much clearer because of TATRC's review process. Our efforts in airway management are an excellent example of the collaboration that can help improve outcomes in both military and civilian trauma care."

References Cited:
Lockey D, Davies G, and Coats T. Survival of trauma patients who have prehospital tracheal intubation without anaesthesia or muscle relaxants: Observational study. *BMJ,* 323:141.

Wang HE, Lave JR, Sirio CA, and Yealy DM. Paramedic intubation errors: Isolated events or symptoms of larger problems? *Health Affairs,* 2006, 25, no.2: 501-509.

Barb Ruppert
TATRC science and technology writer

Graduates Complete Rigorous AAP Program to Boost Careers

Fort Detrick hosted a graduation ceremony for 24 students who earned Advanced Acquisition Professional certificates as part of the U.S. Naval Postgraduate School's distance learning program.

The 12-month AAP program is open to military and federal civilians, and provides an in-depth review of the Department of Defense acquisition process. The distance learning program lets students earn graduate credit toward an NPS master's degree as well as qualify for a Defense Acquisition Workforce Improvement Act Level III Certification in Program Management.

Many students had already been tasked with program management responsibilities in their full-time jobs. Training was critical, but time constraints created a hurdle. Graduate Patricia Dubill, a biomedical engineer at the U.S. Army Medical Materiel Agency, was thankful for the flexible alternative to the traditional classroom. "Our command, and others, saved significant time and financial resources by being able to take the NPS course here in Frederick," said Dubill.

The program follows an ambitious outline with coursework covering such topics as acquisition and program management, information technology, financial management, contracts, logistics, and leadership.

Retired Col. Dave Matthews, 16-year veteran NPS lecturer in Defense Systems Acquisition and Project Management, stressed the program's main goal: "It greatly enhances the students' professional development and qualifications." In 1985, Matthews graduated from a similar 19-week resident program at the Defense Systems Management College. "DSMC is still teaching an evolved equivalent of what I took in 1985," explained Matthews. "The advent of the DAWIA in 1991, and its inherent prerequisite certification requirements to hold key acquisition positions, intensified and focused acquisition training and education."

Matthews' professional experience helped shape his curriculum: "Having 'been there, done that' is essential to being a credible pedagogue. In my case, I ended my active-duty career with four years as the project manager for the Army Tactical Missile System."

Dubill appreciated that her instructors had worked in program management, either for the government or a defense contractor, and could offer invaluable insights. "It is very important to have instructors with this type of hands-on experience, rather than just ivory tower theorists who've studied 'program management' but never had to apply it in an actual workplace," said Dubill.

Students were just as eager to share their perspectives, a dynamic welcomed by fellow graduate Dr. Mark Dertzbaugh, chief of the Business Plans and Programs Office at the U.S. Army Medical Research Institute of Infectious Diseases. "[Two] were very outspoken during the class and made it engaging," said Dertzbaugh. "This class had a number of students who had responsibilities at the second- or third-tier management level for their activities who will probably be in those positions for a long time, providing continuity in knowledge to the command."

Dubill added, "I always benefit tremendously from the networking aspect of training—learning from the expertise of other people and being able to draw on them as resources in the future. … There was tremendous

Dr. Kenneth Bertram presents the AAP certificate to Dr. Mark Dertzbaugh and Patricia Dubill. The goal is to offer the program every other year.
Photos by Doug Valentine

synergy stemming from our different backgrounds—technical, logistics, finance."

The best programs impart lessons that sustain a lifelong career.

"A critical point that one of our instructors made throughout his class was the importance of PMs needing to take risks in order to be successful in their work," Dubill said. "This reinforced my inclination to go out on a limb in seeking solutions to difficult medical care challenges and the importance of seeking creative solutions to problems in general."

Advanced Acquisition Professionals:

- Eric Abbott
- Lt. Col. Jaime B. Anderson
- Andrea Atkinson
- Todd Bishop
- Raymond Boell
- Scott Brady
- Robin Bryan
- Maj. Matthew Clark
- Mark Davis
- Dr. Mark Dertzbaugh
- Patricia Dubill
- Lt. Col. David Hammer
- Alan Harner
- Col. Isiah (Ike) Harper
- Louis Jasper
- Bobbie Kirby
- Henry Kobrinski
- Lt. Col. Jennifer Lindsay-Dodoo
- Cassandra McFadden
- Maj. Mark Plooster
- Maj. Douglas Stratton
- Charles Strite
- Dr. Jeffrey Teska
- Paul Updike

Jill Lauterborn
USAMRMC writer

Field Water Testing Device Passes Test

As a U.S. Army Medical Research and Materiel Forward Medical Operations officer, Maj. Denise Milhorn knows the importance of clean water, noting that "in Afghanistan, or any austere environment, the ability to test water for coliform contamination in a timely manner is imperative and continues to be a concern. At far-forward operating bases and combat outposts in southern Afghanistan, water samples have tested positive for coliform contamination, effecting unit readiness. Even at larger operating bases, there have been outbreaks of contact dermatitis and gastrointestinal issues as a result of showering in contaminated water. To ensure the health and welfare of our Soldiers, there is a definitive need for improved water testing capabilities at remote locations like Afghanistan."

The current field test for coliform bacteria and *Escherichia coli* bacteria—indicators of sewage-contaminated water—take 24 hours to complete. To improve water testing capabilities, the Coliform Analyzer, an instrument now in advanced development, provides several key improvements over the current test. When fielded, the Coliform Analyzer will reduce test completion times from 24 hours to 8 hours or less, allow 16 samples to be tested simultaneously, minimize interferences and reading errors, provide nonsubjective quantitative information, and generate an automated report of results, all at a reduced size and weight from the current field test.

Recently, the Coliform Analyzer took an important step toward fielding by passing an independent laboratory

evaluation of its capabilities. In testing conducted at Clancy Environmental Consultants, a subsidiary of Tetra Tech, the performance of the Coliform Analyzer was found to be in strong agreement with traditional detection methods for both coliform bacteria and *E. coli.*

Pacific Technologies and the U.S. Army Center for Environmental Health Research developed the Coliform Analyzer through a Small Business Innovation Research project that has now been transitioned to the U.S. Army Medical Materiel Agency for advanced development. Additional performance testing by the Army Medical Department Test Board is scheduled for May 2011; required evaluation using the U.S. Environmental Protection Agency's Alternative Test Procedure is planned for the summer of 2011. The Coliform Analyzer is scheduled to reach Milestone C at the end of fiscal year 2012 with initial procurement in FY13. The principal users will be U.S. Army Preventive Medicine personnel, but other military services have expressed interest in using the device.

Dr. Bill Van Der Schalie
USACEHR

Protecting Soldiers' Vision

Staff Sgt. Eduardo Alegria measures the refractive power of lenses according to MCEP specifications.

Photo by Scott Childress, USAARL

When I deployed to Iraq as a cannon crew member with the 101st Airborne (air assault), each Soldier in my unit was supplied with two pairs of goggles—one to provide protection during air assault missions and another to provide ballistic protection. Even though the unit leaders instructed us to use our goggles, the matter was not strictly enforced so Soldiers placed their goggles on their helmets. As a result, many Soldiers incurred eye injuries, and some even lost their eyesight in various combat situations.

During my second deployment to Afghanistan as a combat medic with an artillery unit, my unit leadership, like that of my air assault unit leadership in Iraq, instructed us to use military combat eye protection. However, this time the Military Combat Eye Protection-use standards were enforced. All Soldiers were ordered to use their protective glasses even during the night. This meant we had to change the lenses in our glasses twice a day—gray lenses for daytime and clear lenses for nighttime use. Getting into the habit of wearing MCEPs 24 hours a day and changing the lenses was very difficult. Honestly, it was a pain. But as my deployment progressed, and I witnessed firsthand what shrapnel did to the eyes of Soldiers who were not wearing MCEPs, wearing eye protection became extremely important to me. In no time it became second nature. I knew how to protect my eyesight and that of my fellow Soldiers—wear approved MCEPs.

Now, I am assigned to the Sensory Research Division of the U.S. Army Aeromedical Research Laboratory. I have the privilege to work alongside vision scientists and eye care providers who study combat eye injuries and how to better protect Soldiers' vision. Now, more than ever, I understand how important eye protection is; how it is designed to protect a Soldier's vision from dust, wind, sunlight, and shrapnel/ballistic fragments; and how much work goes into providing Soldiers with the safest eyewear available.

For many years, USAARL has evaluated the ophthalmic characteristics of eye protection and provided recommendations to industry and project managers to ensure that the eye protection worn by Soldiers meets military requirements. This means when a Soldier puts on a pair of MCEPs included on the Authorized Protective Eyewear List, he or she is wearing eye protection that has been tested by vision experts and approved by users.

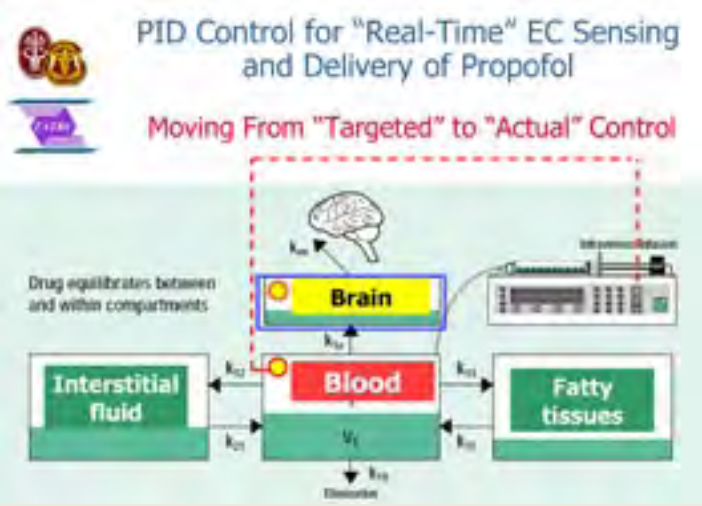
Other ways USAARL is ensuring that vision is protected include identifying ways to reduce the incidence and severity of combat eye injuries, identifying ways to increase Soldiers' use of eye protection in combat, investigating the relationship of eye injury caused by the initial pressure of a blast (as opposed to secondary effects of the blast such as shrapnel) and the use of protective eyewear, and developing methodologies and standards to better assess the effectiveness of protective eyewear.

It is very reassuring to know that the Army keeps moving forward to better fit Soldiers for battle. As Soldiers we can feel confident knowing that when we wear MCEPs we are reducing the likelihood of sustaining an eye injury.

To learn more about authorized eyewear, visit https://peosoldier.army.mil/pmseq/eyewear.asp.

Staff Sgt. Eduardo A. Alegria
USAARL

TATRC Supports Study for an Automated Anesthesia System



This schematic shows direct, real-time feedback control by electrochemical biosensors directing drug delivery through a feedback loop to a pump delivering propofol to a patient.
Image courtesy of Edward Chaum, M.D., Ph.D.

Researchers in Tennessee have developed the first biosensors that can directly measure levels of the anesthetic drug propofol in the body. Rapidly and accurately measuring these levels in real time is the key to putting into use a safe and effective automated anesthesia system.

Biosensors can be used with automated delivery pumps as part of a target-controlled infusion anesthesia system, which delivers blood concentrations of drugs for general anesthesia or conscious sedation. Studies of TCIA systems have shown improved anesthesia outcomes and reduced hospital costs. Such systems are in use in operating theaters in Europe and other countries but are not yet approved by the U.S. Food and Drug Administration for U.S. military or civilian use.

The U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center is supporting studies to validate the new biosensors. TATRC deputy director Col. Ron Poropatich explained that the military has identified a need for new technologies for real-time monitoring of casualties. He said, "This project relates particularly to the need for a highly portable, autonomous anesthesia system that can be used to maintain sedation during aerial transport."

Other recently developed sensors measure the depth of sedation via exhaled byproducts, blood pressure, and other indirect measures. The Tennessee team has created and successfully tested electrochemical sensors that can directly and continuously measure propofol levels in the blood at extremely low concentrations that are within the dose range of the drug.

The team fabricated smaller and smaller electrodes coated with organic membranes until arriving at coated gold electrodes that achieved the accuracy and sensitivity researchers were seeking. These can be lithographed (printed) in large quantities at a low cost.

Collaborators on the project include biomedical engineering professor Dr. Erno Lindner at the University of Memphis, Dr. Tim McKnight at Oak Ridge National Laboratory, and Dr. Edward Chaum of the University of Tennessee Hamilton Eye Institute and Department of Biomedical Engineering.

Chaum said, "Our data demonstrates significant progress toward developing an autonomous TCIA prototype that can be rapidly fabricated, validated, and implemented for closed-loop (automated), target-controlled infusion anesthesia." The team hopes to have the prototype ready by the end of this year as the next step toward the goal of FDA approval for clinical use.

TATRC Trauma Portfolio manager Dr. Thomas Knuth said, "This project is an excellent example of how TATRC shapes federally funded research to meet real needs. The team was developing electrochemical sensors for other uses, but when TATRC became involved, we asked if they could apply these sensors to meet the military need for a closed-loop system to measure and regulate propofol. Their work is very promising, and we hope it could eventually be applied to other anesthesia drugs."

Barb Ruppert
TATRC science and technology writer

Army Laboratories Work Together to Defeat Dengue

WRAIR and USAPHC Mosquito Trap Technology Receives National Award

FKMCD inspector Brian Dillon (left) and SpringStar employees Susan Neal and Christian Banfield prepare to set out traps in Old Town, Key West, due to recent dengue outbreaks.
Photo courtesy of SpringStar

With Florida's dengue outbreak last year, Key West residents became the beneficiaries of a mosquito trap technology first developed by Army laboratories nearly a decade ago and recently transferred to private industry for commercial use and distribution worldwide.

The World Health Organization considers dengue one of the most serious mosquito-borne viral diseases with approximately 20 million cases a year and 100 countries affected. Dengue is a threat to deployed troops, as well as residents, of tropical and subtropical climates. A vaccine is not yet available so mosquito control remains critical to prevention. There are reports that conventional ground and aerial application of insecticides are not adequately controlling the mosquitoes that transmit dengue. Dengue is primarily transmitted by the *Aedes aegypti* species of mosquito, which is a container breeder, meaning the female will only lay eggs in a container holding water.

U.S. military research scientists Michael Perich of the Walter Reed Army Institute of Research and Brian Zeichner of the U.S. Army Center for Health Promotion and Preventive Medicine, now called the U.S. Army Public Health Command, believed they could use the "female mosquito's irrepressible urge to oviposit" to develop a trap with advantages over conventional methods of controlling the population of container-breeding mosquitoes.

The result was the Lethal Mosquito Breeding Container, a pint-sized cup with water and a strip treated with a small amount of pesticide. By killing adult female container-breeding mosquitoes and their mosquito larvae, the population of biting mosquitoes is substantially reduced thus decreasing both the potential for disease transmission and the breeding stock for the next generation. This approach is superior to only trapping and removing eggs laid by female container-breeding mosquitoes, which just go on to lay additional eggs in a natural site that allows complete development of the larvae to adults.

Protected by several patents, the technology was field-tested at WRAIR with results of up to 100 percent adult mosquito mortality.

Under a Cooperative Research and Development Agreement between USAPHC and SpringStar, Inc., Zeichner worked with the small, U.S.-based pest control company to design a commercial version of the lethal ovitrap fit for mass production. The Office of Research and Technology Applications at the U.S. Army Medical Research and Materiel Command then negotiated an exclusive, worldwide license between USAPHC, WRAIR, and SpringStar.

After Florida's dengue outbreak, the state issued an emergency-use permit, and Zeichner traveled with SpringStar employees to Key West to distribute lethal ovitraps to area residents. They joined efforts with the Florida Keys Mosquito Control District, Armed Forces Pest Management Board, U.S. Department of Agriculture/Agricultural Research Service, and Key West Naval Air Station.

In January 2011, the Lethal Mosquito Breeding Container was selected as a winner of the Federal Laboratory Consortium 2011 Award for Excellence in Technology Transfer. Inven-

tors Zeichner and Perich (who died in 2003) will be recognized at an award ceremony May 5, 2011, at the FLC National Meeting in Nashville, Tenn.

The Award for Excellence in Technology Transfer is presented annually by the FLC, recognizing laboratory employees for outstanding work in transferring a technology developed by a federal laboratory to the commercial marketplace. A distinguished panel of technology transfer experts from industry, state and local governments, academia, and the federal laboratory system evaluated the nominations. Since its inception in 1984, the FLC award has become one of the most coveted honors in the technology transfer field with nearly 200 federal laboratories honored for their work in projects that advance the mission of technology transfer.

Sara Baragona

The Lethal Mosquito Breeding Container, known as Trap-N-Kill, is distributed by SpringStar.

Photo courtesy of SpringStar

Col. Gaston Bathalon and Gen. Ann E. Dunwoody exchange greetings.

Gen. Dunwoody greets and coins USARIEM Soldiers Spc. Sarah LaBrada and Spc. Robert Hollins.

Gen. Dunwoody Visits USARIEM

During a March 3 orientation visit to the Natick Soldier Systems Center in Natick, Mass., Gen. Ann E. Dunwoody, commanding general of the U.S. Army Materiel Command, spent some time learning about the U.S. Army Research Institute of Environmental Medicine's role in biomedical research within the U.S. Army Medical Research and Materiel Command.

Col. Gaston Bathalon, USARIEM commander, briefed Dunwoody on USARIEM's use of the Doriot Climatic Chambers for performing physiological research in simulated environmental conditions. As she entered the Doriot Climatic Chambers, a line of human research volunteers greeted her. She shook hands with each Soldier and queried them on their roles as HRVs.

While touring the newly renovated USARIEM building, Dunwoody received a briefing from each of the research division chiefs. Her high level of interest in understanding the research mission was clear by the pointed questions she asked.

In a note to the USARIEM workforce, Bathalon wrote, "Gen. Dunwoody left with a very positive impression of USARIEM. Her big picture view was that USARIEM and NSRDEC [Natick Soldier Research, Development & Engineering Center] collaborate on many important projects and issues, that we do reimbursable work for NSRDEC that is value added, that we have been very successful in building upgrades—a model for post, and that you all are passionate at what you do to support the Soldier."

Brig. Gen. Harold Greene, commanding general of NSSC, hosted the visit.

Terry Rice
USARIEM

TARA to the Rescue

When the equipment fails, the lights go out, and all seems lost, USAMMA's Technology Assessment and Requirements Analysis team provides the logistical know-how to put medical facilities back on track.

"Today is a blur for me," says Terry Dover, Chief Warrant Officer 3, fresh from temporary duty. "I walked into my office over there, and I said, 'Where's all my stuff?'" Thankfully, it was just another move. His papers and belongings lie boxed in a new office. A framed photo of his smiling family sits on the unfamiliar desk.

Dover himself is used to being on the go. He and colleagues on the Technology Assessment and Requirements Analysis team have experienced steady growth and inevitable changes over the past few years. Dover is project manager for Clinical Technologies and the TARA team lead, Integrated Clinical Systems PMO.

TARA falls under the U.S. Medical Materiel Agency, a key component of the U.S. Army Medical Research and Materiel Command. USAMMA manages strategic-level medical logistics and provides medical equipment for Active Component, Army Reserve, and National Guard forces. Comprising a full-time team of 14 and drawing on a corps of expert consultants from the Office of the Surgeon General, the TARA team conducts thorough analyses of medical treatment facilities. It assesses clinical operations; workload requirements; technical operations; and equipment maintenance, use, and life cycle. TARA translates those findings into recommended process improvements and equipment replacement plans. Since 1995 the program has a recognized cost savings or avoidance of $231 million for the Army Medical Department in service and maintenance contracts, equipment purchases, group buys, and environmental hazard reduction.

Natural Disaster, Man-Made Solutions

When tragedy struck Haiti, Project HOPE turned to TARA lead Terry Dover and other experts for logistics know-how.

On Jan. 12, 2010, a 7.0 magnitude earthquake struck near Port-Au-Prince, Haiti, killing as many as 300,000, injuring another 300,000, and leaving 1 million homeless. In the wake of the disaster, Project HOPE sent doctors, nurses, technicians, and medical supplies to Haiti aboard USNS Comfort. Leading the medical response team was Col. Fred Gerber (U.S. Army, Ret.), Project HOPE country director for Iraq and Special Projects.

In March, Gerber turned his attention to three timeworn hospitals: the 70-bed Adventist in Diquini, Port-Au-Prince; the 130-bed Albert Schweitzer in Deschapelles; and the 73-bed Sacred Heart in Milot. All were overwhelmed, taxing their sanitation infrastructure and electrical capacity. And each faced dire shortages of medicine, oxygen, and potable water.

Where others might see futility, Gerber saw opportunity, drawing on his longtime tenure as a medical planner and operator for the U.S. Army Medical Department.

"It was a perfect opportunity to do a health facilities assessment to identify the gaps," he explains. "I did it in the military with the Health Facilities Planning Agency. They would put teams together—mechanical and electrical engineers, architects, health facilities planners, nurse critical assessors and medical equipment, repairmen, technicians from USAMMA."

With himself as lead, Gerber put together an assessment team. TARA lead Terry Dover joined as the team's biomedical equipment specialist. "I went as a Project HOPE member," Dover says, "using my TARA and HFPA background, that process, and applying it to what we knew."

The team assessed Albert Schweitzer April 7, Sacred Heart April 9, and Adventist April 11, inspecting each facility from top to bottom. Dover inventoried all usable medical equipment as well as defunct gear to determine whether it was repairable. Gerber knit together Dover's assessment with those of the other members to provide each facility with not just short-term fixes but broad, long-term solutions.

Dover's team charts an ambitious schedule. It is slated to assess at least seven Army medical centers and hospitals this year alone. By year's end the TARA team will have zigzagged across the country from Maryland to Kentucky, Texas, Georgia, Washington, Alaska, and California. In past years the team has deployed to such far-flung locales as Korea, Kuwait, Afghanistan, Iraq, and Honduras.

The team has made vital changes to outdated doctrine at medical treatment facilities worldwide. Dover cites the increased use of and reliance on CT (computed tomography) scans as a prime example.

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The Project HOPE team found hospitals in dire need of rewiring, new equipment, proper sanitation, and clean water—necessities predating the earthquake. Considering the facilities' meager funds, the team thoughtfully compiled then prioritized recommendations, underscoring issues that required immediate attention. "[We explained that] this is going to save lives," says Dover. "And this is what is going to keep your hospital running 24/7 instead of 10 hours a day because there's no reliable power."

Photos courtesy of Terry Dover

"We looked at several hospitals," Dover explains, "[but] really laid out a plan to rebuild the entire medical infrastructure."

Tim Traynor of the CRUDEM Foundation, facility director at Sacred Heart, was particularly impressed by the team's assessment of his hospital's electrical system, marked by exposed wires that would actually short out and catch fire during surgeries.

"[The lack of] reliable electricity in Haiti is the bane of progress," Traynor explains. "The timing was perfect because [our systems] were under the greatest amount of physical strain and stress, and there were opportunities to take measurements and make observations unique to such stress."

The team presented Traynor with a plan to rewire the entire electrical system and soon acquired all the necessary wire, panels, and other parts. The plan also addressed other problem areas, including patient capacity, air filtration, and adequate roofing.

"The core value of the document lies in the fact it was integrated from multiple disciplines," Traynor says. "Things were not taken in a vacuum—they were looked at in the greatest overall picture. I was very surprised at the quality. For a group that basically went in and was very intuitive, they walked out with a picture that took me probably two and a half years to put together in my mind. They did it in a couple weeks, and that's impressive, very impressive."

January marks a year since the earthquake. Even before it struck, life in Haiti was rough going. The hospitals were rationing power, and the quake further taxed their electrical systems. Now the country is reeling from political upheaval while fighting a deadly cholera outbreak; Sacred Heart alone treated more than 1,000 cholera patients in November and December. And while funds have been pledged, they have been slow to arrive.

Traynor stands in the gap at Sacred Heart and remains unperturbed. "It is important we keep our heads and continue to make plans and progress in the face of all these other obstacles, and I think that's the greatest contribution these guys made. They were in a chaotic environment, they did perform a very valuable function, and they've all said whatever they can do to help, they'd like to continue. [They deserve] a lot of gratitude for that."

Jill Lauterborn
USAMRMC writer

"CTs were not the standard," he says. "But if you look at how and when that doctrine was written, it is very dated. We changed things dramatically when we went into the Gulf War but even more so with our current conflicts. The CT became essential [toward assessing] the types of trauma we are seeing now.

"When you have a person who is unconscious or with a blast injury, you cannot really diagnose internally what is going on," Dover explains. "With a CT you can see everything to some degree, and you can perform a CT scan in a couple of minutes—know what is broken, what is not broken, where things may be bleeding or not bleeding. That becomes critical when you go into surgery."

Dover and his team understand that the benefit of CT scans extends beyond the operating room as the results provide important feedback to field combat units.

"If we see certain head injuries on a CT," he says, "we know the armor is not doing the job. Or, maybe it's doing the job but missing this part of it. So people are going to go back and say, 'Look, we know blast injuries are doing this. We are protecting the skull, but we have all these other problems.'"

CT is just one tool in TARA's growing arsenal. Dover's overriding mission is to assemble joint teams to better understand how different forces' facilities might operate.

"The intent is to pool [experts] from different areas," Dover says, "so when we walk through the doors [of any] facility, that gives us instant credibility. There are some nuances how the Army does things, how the Air Force does things, and how the Navy does things, but ultimately how they treat patients is really the same."

Col. Kelly Wolgast has worked in every capacity imaginable—as a team member and TARA recipient in addition to being commander of Evans Army Community Hospital at Fort Carson, Colorado. She bears out the team's reliance on authoritative consultants.

"When you have a radiologist speaking to radiology people about radiology things," says Wolgast, "those conversations tend to go very quickly because everybody understands each other. When I speak about clinical systems and nursing care, well, as the senior nurse executive in the U.S. Army Medical Command, that's my role and responsibility, and I am perceived as an expert in that so that's a good thing. You're already over the credibility hump."

For those facing new assignments, a TARA assessment can outline a facility's capabilities, enabling incoming personnel to quickly get up to speed. Last winter the team traveled to Soto Cano Air Base in Comayagua, Honduras, to evaluate the medical element at Joint Task Force-Bravo in advance

A Gift from Heaven

The boy at left in the photo (page 13) was standing on the outskirts of a crowd just outside our triage area at Sacred Heart Hospital in Milot. I noticed he had something stuffed under his shirt. We had just brought in a couple of badly injured children, and their cries drew the crowd closer. The boy was looking on with concern when I approached and asked what he had beneath his shirt. Tugging free a small American flag, the boy draped it over his shoulder and said in halting English, "This is my flag." I asked where he had gotten it, and he replied that a "flying man" had given it to him.

As the boy continued his story in Creole, a Haitian friend of mine stood by to translate.

The boy had been standing in the corner of a soccer field turned airfield, watching the medical transports take off and land, when one of the pilots passed by, headed back to his helicopter. Noticing the boy, the pilot reached into his flight jacket and retrieved the small banner. The exchange was quick, as the pilot boarded his chopper and in a minute was gone in a swirl of dust and noise.

I asked the boy if he knew where America was, and he said it was near heaven.

That choked me up, but I kept my composure and asked if I could take his photo. He consented. Amid the tall and shifting crowd, this little man again spread the flag over his shoulder. In an instant, an even smaller boy leaned into my viewfinder, took a corner of the flag and stared back at me with a look that said he was essential to my photo. I snapped four, maybe five shots before the boy with the flag melted back into the crowd, quickly rolling up his treasure and stuffing it safely back under his shirt.

When I returned to the compound well after dark and downloaded my photos from the day, I found the one of the two boys and our flag staring back at me with the words "America is near heaven" echoing in my heart. The image of angels descending from a place where life was good to save these damaged souls caught me open, vulnerable, and the tears flowed.

of a new logistics chief. What the team found was a facility in need of logistical guidance.

JTF-B is wholly dependent on generators for its power. The climate is hot and humid with rain half the year—conditions that are hard on equipment. In lieu of local support, base personnel must send the equipment stateside for maintenance. And if a crisis occurs, humanitarian or otherwise, staff must pull field equipment from the clinic.

In just one week Dover and 10 team members combed through JTF-B, evaluating the facility's nursing and operations, its equipment and laboratory, its diagnostic imaging, and its image archival and transferal system. The resulting report included an eight-page inventory of more than 150 items, from operating tables to defibrillators to battery chargers, listing manufacturers, model numbers, life expectancy, and replacement dates for each piece of equipment. This list will serve as a replacement and acquisition plan. TARA also streamlined the cumbersome equipment replacement process and made specific recommendations in other areas, from training to staffing to record-keeping, all with an eye on improving safe operations and the quality of care.

U.S. Air Force Maj. Andrea Ryan, the incoming logistics chief, reported to JTF-B four months after the assessment but had plenty of praise for what Dover's team was able to achieve in its short time at the facility.

"Chief Dover has been nothing short of amazing," says Ryan. "The TARA team was able to assess the equipment and put together a replacement schedule, ensuring that critical medical equipment used in delivering health care to our deployed members is the best it can be and within safety and regulatory management controls.

"[That] support for field operations is more than any medical logistics officer could ask for."

TARA is working as fast as it can to meet the growing demand.

"The demand is pretty high," Wolgast admits, "but we can only do so many a year. So we look at the schedule and focus on places that emerge as high need, for instance, a place that had a natural disaster [see sidebar, "Natural Disaster, Man-Made Solutions"] or some sort of facility failure. We could do a visit like that."

Dover keeps his suitcase and rucksack handy, just in case.

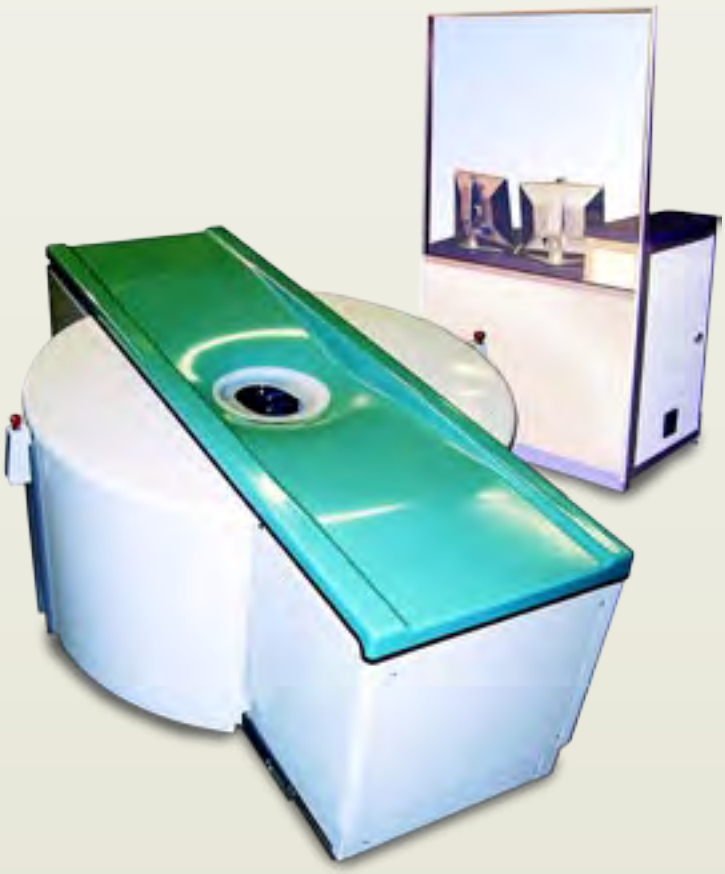
For more information on the TARA program, visit http://www.usamma.army.mil/tara.cfm.

Jill Lauterborn
USAMRMC writer

During those days of stress, uncertainty, and desperate vigilance, the image of that boy remained most poignant to me, as in just a few words he summed up my reason for being there. It was my privilege to do all I could to help save lives and reduce the suffering of the Haitian people.

Tim Traynor
recipient of Project HOPE's Services

Improved Breast Cancer Imaging Technology Could Be in Use This Year



The Koning Breast Computed Tomography system rotates to provide 300 images in about 10 seconds, achieving better images than mammography.

Image courtesy of Koning Corporation

A new imaging technology that produces more detailed, three-dimensional images for better breast cancer detection and diagnosis, with the radiation dose within the range of traditional diagnostic mammography, is being developed by Koning Corporation.

The new Koning cone beam Breast Computed Tomography system is showing promise for breast cancer diagnosis, guided biopsy procedures, and treatment monitoring and planning. It is currently being tested by doctors at the University of Rochester and Elizabeth Wende Breast Care, LLC, in Rochester, N.Y. The company hopes to get U.S. Food and Drug Administration market approval in 2011, allowing KBCT's use in U.S. Army and Veterans Affairs hospitals soon.

The clinical studies required for FDA approval have been supported by the U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center and the National Cancer Institute. TATRC Medical Imaging Portfolio manager Dr. Anthony Pacifico says, "Cone beam CT technology offers a thought-provoking direction for cancer diagnosis and treatment because it provides detailed images with substantially less radiation than traditional CT scans."

According to David Conover, Koning Corporation's director of research and development, the mammography that is currently used for breast cancer screening misses 30 percent of breast cancers. He notes, "The high-resolution, 3D images provided by KBCT show exactly where tumors are located and offers the potential to better differentiate malignant from benign tissue. In addition, KBCT can visualize microcalcifications that may indicate early stage cancer, which MRI cannot." The company initially intends its technology for diagnostic breast imaging and in the future for minimally invasive biopsies and treatment procedures.

KBCT uses a cone-shaped x-ray beam and a digital flat panel detector to rapidly produce images. The patient lies face down on a table with her breast hanging freely into the donut-shaped CT gantry, which takes a complete rotation of images in 10 seconds.

The Military Health System provides health care to approximately 2.5 million women ages 35 and older who could be affected by breast cancer. More than 200,000 women currently serve on active duty in the U.S. armed services.

Conover says, "It is exciting to be in a position to potentially help so many people through early detection or help determine the most efficient treatment approach, particularly in the context of keeping the U.S. armed forces at their best."

Barb Ruppert
TATRC science and technology writer

TATRC Leverages Natural Immunity to Find New Vaccines

There are few effective vaccines against infectious diseases, such as malaria and tuberculosis, which are caused by parasites or bacteria capable of growing within human cells. However, some individuals do develop immunity that protects them from these diseases. One company has developed a way to rapidly explore this immunity in the hopes of quickly discovering new vaccines and improving existing ones.

Genocea Biosciences is working with the Naval Medical Research Center to apply its new screening technique to malaria, one of the top five global killers. The project is funded by the U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center. Says Dr. John Carney, who manages TATRC's Infectious Disease Research Portfolio, "This is a different approach. The Genocea effort examines immune cells from people who have developed their own sterilizing immunity—those who could survive when exposed to malaria—to identify how their immune system responded differently so we can generalize this knowledge to vaccine development."

Because the parasites that cause malaria grow sequestered within host cells, immunity requires triggering a response from the body's T cells, which only react to certain proteins in the parasite. According to Genocea Biosciences principal investigator Dr. Jessica Flechtner, many vaccine programs have been ineffective because no one had found a way to efficiently screen all possible antigens (proteins) from a disease-causing pathogen to find the ones that stimulate T cells.

Flechtner explains, "Genocea was founded on the premise that we could learn from natural immunity. We theorize that we can intelligently design vaccines by targeting the same part of the pathogen as the people who naturally mount protective immune responses." Genocea researchers have developed a core technology that allows them to rapidly determine which antigens from the entire proteome of an organism are able to elicit T cell responses in humans.

The U.S. Military Malaria Vaccine Program, a research enterprise harnessing the talents of vaccine developers from NMRC and from the Walter Reed Army Institute of Research, is vitally interested in developing a malaria vaccine to protect military personnel deployed to malarious areas throughout the world, many of which are potential locations for U.S. military engagement.

Navy Capt. Tom Richie, research coordinator for USMMVP, believes that Genocea's technology may help: "As the malaria parasite consists of more than 5,000 proteins, identifying which of these proteins could be most immunogenic and protective in a vaccine is of vital concern. For this reason, we have partnered with Genocea and have provided banks of T cells from human volunteers immunized with an experimental vaccine and protected against malaria challenge to support the company's screening technology. We have also provided *Plasmodium falciparum* sporozoites, the infectious form of the parasite."

The Genocea team recently used the sporozoites from USMMVP to develop a library of antigens from the parasites and in the first half of 2011 will be screening them against the T cell samples the NMRC has collected from immunized volunteers. Half of the samples are from those who produced a protective T cell immune response, and half are from those who did not. The group will use the identified antigens to develop a malaria vaccine that takes best advantage of the body's natural immune defenses.

According to Flechtner, a vaccine would have great advantages over current antimalarial drugs because there would be fewer side effects and no worries about taking medication on schedule or developing drug resistance.

Barb Ruppert
TATRC science and technology writer

New Project May Lead to Safer Drugs for Malaria and Other Diseases

A team has discovered new avenues that provide hope for improving one of the most effective antimalarial drugs so it is less toxic to certain populations.

Effective prevention and treatment of malarial infections continue to be a high priority for the Department of Defense. Primaquine, discovered in the 1940s, represents one of the most effective classes of antimalarial drugs; however, a significant number of people cannot tolerate this medication. While researchers eventually determined the basis for the bad reactions, it has been difficult to separate the beneficial/therapeutic effects of primaquine from the side effects that limit its use.

Developing safer antimalarial drugs is especially important in light of an April 2010 military report counting malaria among the top infectious disease threat priorities to deployed forces. Infectious diseases can cause more casualties than enemy fire, particularly in tropical regions.

A group from the University of Mississippi is collaborating with four other universities and the Walter Reed Army Institute of Research in a project funded through the U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center. Dr. John Carney, who manages TATRC's Infectious Disease Portfolio, says, "The pharmaceutical industry has always faced the problem that certain genetic heritages predispose some individuals to have a bad reaction to a drug. Getting better separation between the beneficial effects and the side effects is the 'name of the game' in drug development. We hope this project may bring us closer to solving this issue in general."

According to principal investigator Dr. Larry Walker, the 8-aminoquinoline (8-AQ) class of anti-infective drugs is the best available for the treatment of relapsing malaria because it is the only class that kills the parasite's dormant liver stages to prevent continued recurrence. Some of the drugs in this class also are effective against leishmaniasis, another parasitic disease reported as a top threat to military forces.

Yet in some people, 8-AQ drugs cause red blood cells to break down, which causes hemolytic anemia. These reactions are due to a hereditary deficiency of an enzyme, G6PD. This is among the most common hereditary metabolic disorders, and there are a number of different genetic variants described. One variant of G6PD deficiency is particularly common in African Americans.

Several classes of drugs and certain foods cause oxidative stress in red blood cells, and those with a G6PD deficiency do not have the defense mechanism to overcome this stress. In the case of malaria, these individuals then must take alternate drugs that are less effective.

Walker's group has been studying 8-AQs for many years to discover which substance produced during metabolism of these drugs is causing the oxidative stress. Researchers recently found they could make modifications to the drugs to change the metabolism and thus create variations that they hope will be safer and yet still as effective. These variations need to be tested extensively in animal models and ultimately in people.

The second breakthrough that has brought the group closer to a safer drug is finding an animal test that reliably predicts the human reaction. Team collaborator Dr. Rosemary Rochford of the State University of New

York Upstate Medical University has developed a model using immune-deficient mice that are able to tolerate circulating human red blood cells. The team found that nothing happened in mice that were given normal human blood and an 8-AQ drug but that the human blood cells started to break apart if the mice were given G6PD-deficient blood and the same drug.

Says Walker, "This is the first time we've been able to show in an animal model what is happening in people. Now we have a tool to test whether we really can create variations that obtain the same antimalarial effect without causing a reaction. We're learning much about drug toxicity that could have a broad impact on drug development in general."

The group began animal studies on its first 8-AQ variations this fall. Walker notes that their hope is to have compounds ready for human testing within three to four years. "TATRC provides regular expert review to ensure we're on track," says Walker. "This collaboration is an excellent example of congressional funds applied to solve an important military and public health problem."

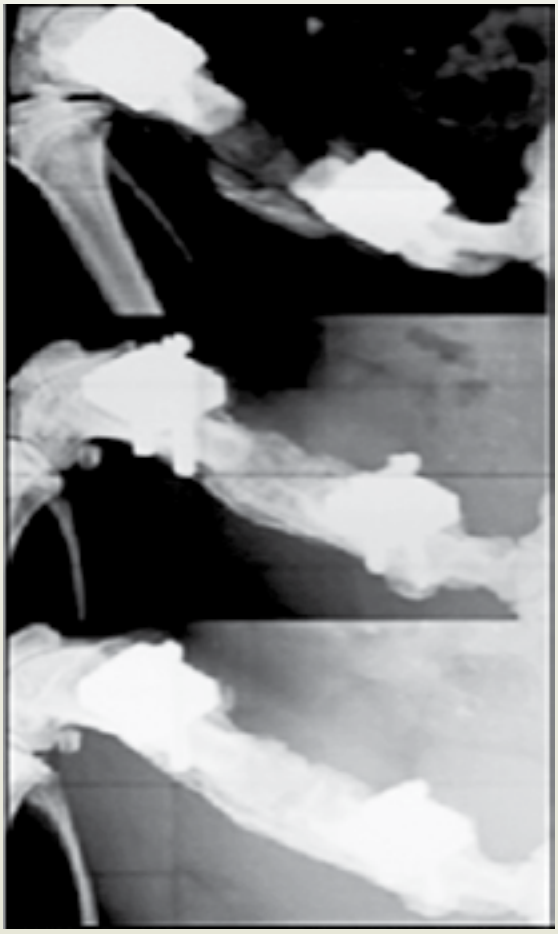
TATRC's Infectious Disease Research Portfolio includes approximately 70 projects. The portfolio is co-managed by the Military Infectious Diseases Research Program.

Barb Ruppert
TATRC science and technology writer

The First Annual Wounded Warrior Project Run took place at the Armed Forces Institute of Regenerative Medicine All Hands Meeting in Clearwater, Fla. Jan. 19. The run was a 2 mile run/walk organized by the members of the AFIRM community to raise awareness and funds for the Wounded Warrior Projects. This was the Third Annual All Hands Meeting.

Command Sgt. Maj. Kevin Stuart hosted a Professional Development session for junior enlisted Soldiers as well as NCOs Feb. 11 at the Community Activities Center. The session included classes on mentorship and guest speakers from the Equal Opportunity Office, the Inspector General Office, the Better Opportunities for Single Soldiers program, and the Association of United States Army.

Translating Research into Real Solutions for Wounded Warriors



X-ray images of bone bridging across a massive bone defect treated with a nanofiber mesh protein release technology developed in the laboratory of Georgia Tech mechanical engineering professor Robert Guldberg.
Image courtesy of Robert Guldberg

Headlines often tell of exciting stem cell research that may help make our injured Warfighters whole again. But what will it take to translate that research into the real ability to reconstruct a shattered face or limb?

One innovative team believes the answer lies in partnerships between the military and private researchers, between engineers and medical clinicians, and between pure science and commercial interests. The approach seems to be working.

The Center for Advanced Bioengineering for Soldier Survivability at the Georgia Institute of Technology partners with the Armed Forces Institute of Regenerative Medicine to assist it in testing strategies for treating composite injuries. AFIRM is a five-year program begun in 2008 that includes academic institutions such as Georgia Tech in a consortium to focus on burns, head and face injuries, and other major war injuries. The U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center supports several projects that are also AFIRM partners, including one in the Georgia Tech center. TATRC's investments in early development of research projects, including shaping of the research to meet military medical challenges, provide the building blocks that feed into the AFIRM advanced products pipeline portfolio. In just two years, the center has filed six patents and taken two technologies into large animal studies. Its first cell delivery technology could make it into commercial use by 2014.

Stem cells are unspecialized cells that can develop into other types of cells needed to repair wounds, regenerate lost tissues, and restore function. Stem cells also contribute by producing important factors that stimulate healing. Much promise lies in the idea of using stem cells from a patient's bone marrow and fat to regrow tissue following traumatic injury. The center is focusing on the "missing link" in this approach: technologies to deliver the right cells effectively and retain them at the injury site to aid in healing.

The center takes advantage of the engineering expertise at Georgia Tech to solve the problems inherent in the development of this important new medical field. In addition to its stem cell delivery technologies, the center has developed new methods for monitoring clinical effectiveness, including standardized small animal models to rapidly screen regenerative medicine innovations. This approach expedites the movement of the most promising technologies to use in humans. Projects under study focus on musculoskeletal injuries and the degenerative conditions that result from these injuries. New projects for nonsurgical detection of internal injuries and for improving healing of skin wounds without scar formation have been initiated this year.

Dr. Eva Lai, who manages TATRC's regenerative medicine portfolio, says, "TATRC connects military and private efforts, with the vision of converting discoveries into useful technologies, which is also the focus of the Center for Advanced Bioengineering for Soldier Survivability. They have developed an effective system for translating basic science to com-

mercial use, which is clearly demonstrated in the center's early successes. This is an incredible accomplishment for an academic organization, which is typically geared toward generation of knowledge primarily and leaves the technology transition and translation to others to pursue."

CABSS director Dr. Barbara Boyan notes, "While much is known about the basic biology of cells in the musculoskeletal system, efforts to convert this information to useful products have been limited. This is in part because research teams have failed to include clinicians and engineers collaborating to ensure their technology is useful and practical, and because industry partners are typically brought in too late to ensure inventions can be incorporated into existing products without re-engineering."

To avoid these pitfalls, CABSS investigators work in teams that include a clinician with military medicine experience, bioengineers and bioscientists with experience working closely with industry, and, wherever possible, an industry partner committed to rapid transfer of the new technologies.

The center reports several recent successes.

A collagen peptide that could help attract new cells to aid in repair of bone structures was licensed to an orthopedic company in 2009 to begin clinical trials, which are the human studies required before a medical device or treatment is approved for patient use.

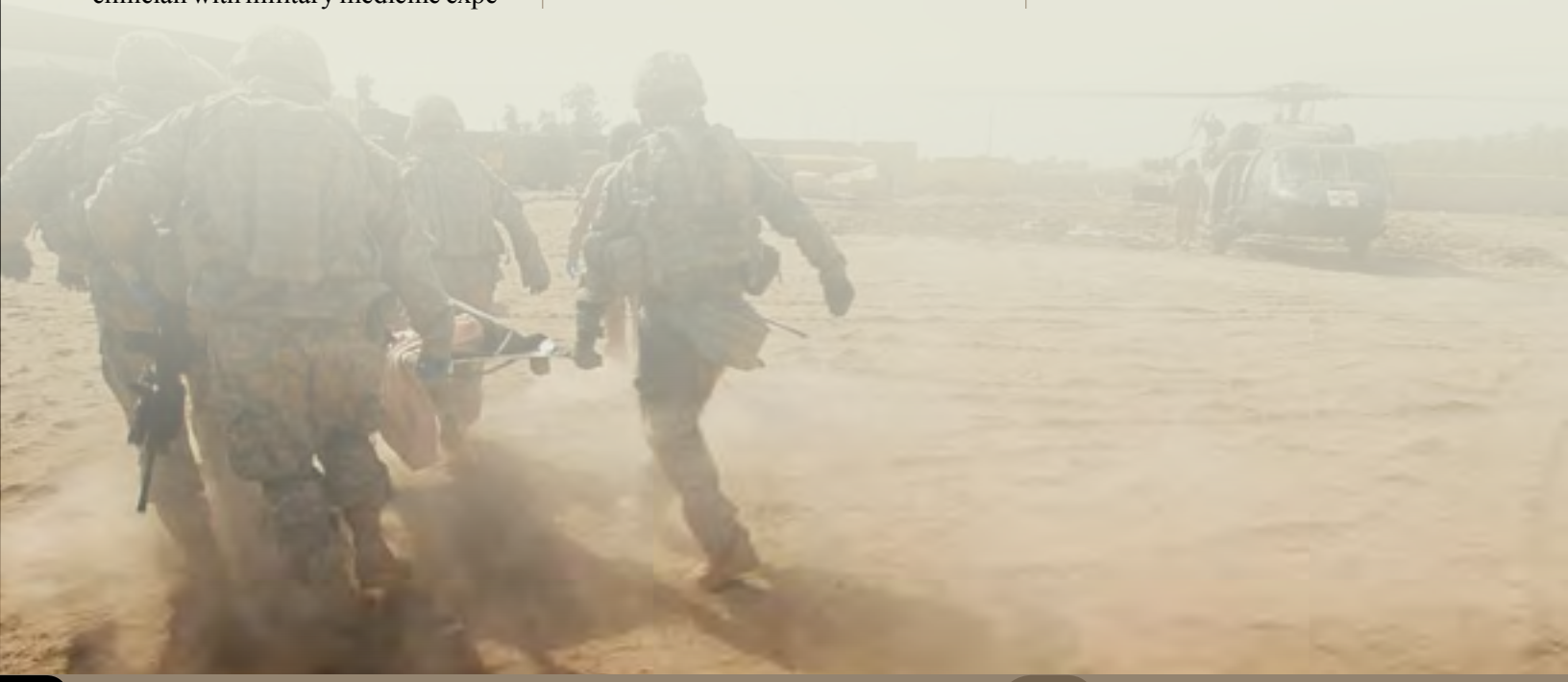
A technology that involves microbeads for cartilage repair began clinical trials in 2009 with a Georgia Tech spinoff company, SpherIngenics. The company was recently awarded a Department of Defense Small Business Innovation Research grant to commercially develop the center's stem cell delivery technologies.

Two versions of a nanofiber mesh scaffold suitable for treating critical bone breaks that won't heal on their own moved to studies in sheep in fall 2010. If successful, the scaffold could move to testing in humans in a year.

TitanSpine has commercialized an improved design for metal orthopedic implants and will be developing the technology with the center. It could be ready for human use in four years.

The center recently began animal studies with the Musculoskeletal Transplant Foundation to develop two new kinds of tissue grafts that will help treat injuries with high amounts of muscle damage. The grafts could move to human testing in two years.

Barb Ruppert
TATRC science and technology writer



Improving Soldier Recovery from Catastrophic Bone Injuries

Researchers around the world are seeking ways to heal all manner of injuries and medical conditions by regenerating damaged body parts. Many are working to repair skeletal injuries by transplanting a patient's own or other stem cells, which are unspecialized cells that can potentially develop into different cell types. While several biomedical companies claim their cultured cell products regenerate bone and cartilage, there are no standard tests for proving products are safe or effective.

Dr. David Rowe of the University of Connecticut has made it his personal mission to provide this proof. He has developed a technique for tagging and viewing bone cells that he hopes will become a standard test for human bone cell transplants—the equivalent of the UL® stamp on electrical items. He explains, "If bone-producing cells are going to be put in people, we need to first prove that these cells do, indeed, become the type of cells researchers say they do."

The U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center is funding Rowe's efforts to study various sources of human cells for bone repair. Notes Rowe, "Dr. Eva Lai [who manages TATRC's Regenerative Medicine Portfolio] understood right away what we were trying to do—that we were trying to find a consistent way to evaluate the many approaches that are already out there rather than developing yet another one."

Lai says, "One of the key strengths of this research project is the screening of therapies to distinguish which cells are contributing to tissue regeneration. It might really get us somewhere because it's a systematic analysis rather than trial and error."

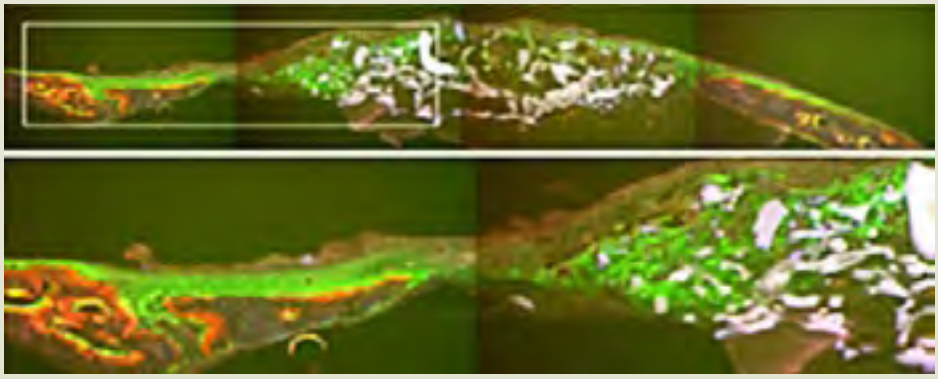
Rowe explained that as he looked at different bone engineering projects, he began to realize that success in humans "is more difficult than the reports of animal studies led us to believe. So maybe those initial tests weren't detailed enough."

Rowe's team developed a fluorescent cell-tagging method to use with human bone cells transplanted into a specially bred line of "reporter" mice to answer specific repair questions involved in skeletal transplants. "We've built different colors into different cells, like tiny fluorescent lightbulbs, that can tell you where they came from and sometimes where they go. So we know if the cells we added are doing what they are supposed to do."

The team takes several views of the fluorescent cells in frozen tissues and compiles them using computer-based imaging. According to Rowe, their tissue imaging and analysis technique is faster and more specific than current methods. "Other ways of examining tissue take weeks, and we can do it in days. In addition, all of the colors lighting up our cells have meaning. Thus, a computer can quantify them, and we can now make databases and compare the outcomes."

Rowe's group is building the infrastructure to be a third-party test facility that can objectively compare investigators' tests with U.S. Food and Drug Administration standards. Their goal is to make consistent images and results available to all researchers, ideally through national centers for imaging, image analysis, and archiving of skeletal repair strategies.

So far, Rowe's work has shown that when injecting human bone-forming cells into mice, the bone that is formed is mostly from the mouse's own cells. Despite what so many investigators



These images show an empty, commercially prepared scaffold that contains pieces of mineral (white slivers) placed in a green mouse. The boxed area (magnified in the bottom image) shows the junction of the host and scaffold within the bone defect. The host is producing a large amount of actively forming bone (red lines) in the surrounding bone as well as many green cells that have migrated into the scaffold. However, the cells in the scaffold are not making bone because no red lines are observed.

hope, "We have a long way to go before human bone forms with this method."

Yet Rowe firmly believes in the possibility of replacing damaged cells with good cells to heal injuries. "We simply have to evaluate carefully along the way to make sure we are going in the right direction," he says. "Researchers in this field will find a bone-healing solution that will aid our troops sooner if we can focus on developing the few therapies that have proven to be significantly better rather than spending money developing multiple therapies that aren't very different or effective. Directing the focus to these few promising therapies is where I hope to contribute."

Barb Ruppert
TATRC science and technology writer

It's Official!

6MLMC is now a part of USAMRMC. There was a patch ceremony Feb. 28 at the Community Activities Center.

New Combatives Level I Trainers

The U.S. Army Medical Research Institute of Infectious Diseases conducted its first Combatives Course Feb. 21–25. The following Soldiers were certified as Level I trainers (left to right): Spc. Ochir Palam, Spc. Christopher Olson, Spc. Stephen Mason, Pfc. Pedro Cuevas, and Spc. Darnell Pierce. In the second row are the Combatives instructors: Sgt. Martavius Ilion, Sgt. Steven Mraz, and Staff Sgt. Leo Chandler.

Spotlight on USAMMCE: The Largest Medical Distribution Center in the DoD

The largest Medical Distribution Center in the Department of Defense happens to be a subcommand of the U.S. Army Medical Research and Materiel Command. The U.S. Army Medical Materiel Center, Europe, located in Pirmasens, Germany, provides the full spectrum of medical logistics support, including medical equipment and supplies, optical fabrication, humanitarian assistance, and training to 1,275 Joint Service customers of the U.S. European, the U.S. Central, and the U.S. Africa Commands, and directly supplies deployed units in Afghanistan and Iraq and 150 U.S. Embassies all over the world.

"We deliver world-class medical logistics to a world-class health care system," said USAMMCE commander Col. William Stubbs.

The average turnaround time for shipments to units in the European Command is 1–2 days and 4–6 days to all other areas.

Lt. Col. Ryan Bailey, USAMMCE's deputy commander for Operations said, "USAMMCE's ability to provide responsive medical logistics support to its customers ultimately saves lives and improves patient care."

To ensure sufficient coverage, the Materiel Management Division constantly monitors the inventory of 11,000 stocked lines to include special requirements for the Army's Veterinarian Services.

The Distribution & Transportation Division is the largest division with 151 employees. They receive an average of 1,370 line items per day and then pick, sort, pack, and ship them to customers.

"D&T is the heart of USAMMCE, the materiel that gets pushed to the customers on three continents is the lifeblood of the AMEDD, without it, health care cannot be provided to service members and their families," said Lt. Col. Douglas Galuszka.

Some may know USAMMCE as the command that produces a variety of optical devices, but it assembles, reconstitutes, disassembles, and manages medical assemblages. Last year, USAMMCE personnel built 5,591 medical sets, kits, and outfits valued at $44.2 million.

Moreover, USAMMCE supports the Department of State's Humanitarian Assistance missions to the Newly Independent States of the former Soviet Union.

Since its beginning in 1992, it has supported 235 hospitals and 242 primary care clinics. It also supports unscheduled missions, such as disaster relief, and specific medical assistance missions.

"USAMMCE disposes its excess materiel directly to our program therefore saving time and money," said division chief, Louis Deandrade.

USAMMCE is a one-stop shop for all medical logistics needs, ensuring customers receive their orders in the shortest time possible.

Doris Crittenden
USAMMCE Public Affairs

Silvia Reinhardt labeling newly received items.

A New Strategic Partnership for WRAIR

Trainees with Col. Aizen Marrogi and Dr. Debra Yourick at WRAIR.

The year 2011 brings a new strategic partnership between the Iraqi Ministry of Defence and U.S. Department of Defense serving Soldiers' and civilians' security and health in both Iraq and the United States. The Walter Reed Army Medical Center hospital and the Walter Reed Army Institute of Research are hosting six Iraqi medical providers—three physical therapists, two microbiologists, and one microchemist.

Arriving Jan. 2, the six Iraqi physical therapists and medical microbiologists began their training rotation. Although the U.S. Army Medical Research and Materiel Command hosted three medical-centric visits in 2010, this six-week program is the first of its kind. The rotation provides a unique combination of lectures and hands-on learning opportunities for the Iraqi medical providers to connect with other experts and specialists from world-renowned, long-standing medical military centers.

The training group is split with three individuals at WRAIR and three at WRAMC. At WRAIR, Col. Aizen Marrogi is managing a busy curriculum for the three microbiologists. It is expected the program will "establish collaboration in the spheres of the WRAIR mission of infectious and communicable diseases with Iraqi MOD Medical affairs." The goal is for them to become the founding core of Iraqi scientific collaborations and provide critical insight to combat the medical problems plaguing Iraq.

Lt. Col. Shannon Lynch oversees the training at WRAMC. The three physical therapists are focusing on physical therapy rehabilitation and prosthetic management for patients with amputations and multi-trauma, as well as general orthopedic conditions most commonly seen in any physical therapy center. The program is a combination of lectures, labs, and patient observations in the Military Advanced Training Center. Lynch states that "the goal is to provide these therapists insight and training into how we manage our military population with these injuries so they can be the leaders and planners of military rehabilitation programs in Iraq as they develop centers similar to WRAMC's Military Advanced Training Center."

This training module encourages continued medical diplomacy as an essential portion of a nation's stability. Through protecting Soldiers' and civilians' health, Marrogi believes this is a "fundamental cornerstone in strengthening the emerging strategic partnership between Iraq and U.S." and is "proud that WRAIR is contributing a significant piece in building this relationship to benefit the Soldiers and people in both great nations." Finally, programs such as this partnership may translate into new directions for training collaborations at WRAIR's laboratories in Kenya and Thailand (U.S. Army Medical Research Unit-Kenya and the U.S. Army Medical Component of the Armed Forces Research Institute of the Medical Sciences in Thailand.

Source information provided by WRAIR

USAMRMC Loans TSAS to British Army

Maj. Gen. James Gilman, commanding general of the U.S. Army Medical Research and Materiel Command and Fort Detrick, handed off the Vibrotactile Balance Rehabilitation Device at USAMRMC Headquarters Feb. 14 to Air Vice Marshal Michael Horwood, U.K. defence attache. Karen Atkins, physical therapist, holds part of the device. The U.K.'s Defence Medical Rehabilitation Centre will receive the device on loan.

Photo by Larry Sorcher

Dizziness and balance issues are the most frequently reported symptoms following exposure to an improvised explosive device.

"A measure was needed not only for the original assessment of Soldiers following an IED event but also to follow the progress of the Soldier during rehabilitation and to determine when the Soldier is ready to return to duty. Screening and assessment of the balance deficits associated with TBI is easily accomplished by experienced otolaryngologists/ENT physicians. Unfortunately, it is rare to have such specialized doctors available at the first level of treatment," said Dr. Angus Rupert and Dr. Benton Lawson, researchers at the U.S. Army Aeromedical Research Laboratory, a subcommand of the U.S. Army Medical Research and Materiel Command.

So USAARL researchers, Rupert and Lawson developed the Vibrotactile Balance Rehabilitation Device. The goal of this device is to allow for screening, assessment of recovery, and rehabilitation of balance deficits following traumatic brain injury, allowing injured Soldiers to return to duty.

The device detects body sway via changes in pressure on a platform on which the patient stands. When sway goes beyond therapist-determined limits, a vibration cue is delivered in the direction of the excessive sway. The patient corrects his/her balance by moving away from the excessive sway signal.

"The process appears to be even more intuitive and immediate than the steering corrections a person makes when his/her car accidentally drifts into the rumble strip on the side of the road," said Lawson.

The initial technology, called the Tactile Situation Awareness System, was developed about 20 years ago.

"TSAS was designed for astronauts to maintain spatial awareness while in the zero gravity environment of space and to recover balance function following return to earth. It helps rotary wing aviators maintain spatial orientation while flying in degraded visual environments, such as brownout. The Vibrotactile Balance Rehabilitation Device evolved from TSAS," said Rupert.

The Vibrotactile Balance Rehabilitation Device is a single horizontal belt of tactors worn around the waist for situations where information concerning rising and falling in the vertical direction (e.g., altitude) are not as important.

Since USAMRMC strongly encourages collaborations, the U.K.'s Defence Medical Rehabilitation Centre will receive the tool on loan Feb. 14 at Fort Detrick.

The commanding officer of the U.K.'s DMRC experienced the Vibrotactile Balance Rehabilitation Device during a demonstration in the United States. Realizing its potential to enhance rehabilitation of people with balance deficits, he sought to obtain one of the devices. The objective of the Cooperative Research and Development Agreement/Material Transfer Agreement is to loan DMRC a Vibrotactile Balance Rehabilitation Device, which will be used as part of a series of ongoing assessments to evaluate devices, procedures, and regimens that may assist injured service personnel to re-learn balance as part of their rehabilitation process. Feedback on its efficacy and suggestions for improvements will be considered as modifications in both hardware and software are made to the device.

The device has been sent to various centers for evaluation, including the Naval Medical Center San Diego and hospitals in the Orlando and Philadelphia areas. Targeted end users include the Naval Medical Center, Walter

Reed Army Medical Center, National Intrepid Center of Excellence, Defence Medical Center Headley Court, and other civilian evaluation/ rehabilitation sites.

Tiffany Holloway
USAMRMC Public Affairs

The Vibrotactile Balance Rehabilitation Device is a single horizontal belt of tactors worn around the waist for situations where information concerning rising and falling in the vertical direction (e.g., altitude) are not as important. The goal of this device is to allow for screening, assessment of recovery, and rehabilitation of balance deficits following TBI, allowing injured Soldiers to return to duty.

Photo by Scott Childress

Northup Named Company Commander of USAMRMC

Capt. Aaron Northup assumed the role of company commander of the U.S. Army Medical Research and Materiel Command at Fort Detrick Jan. 11. In this position, he will oversee the day-to-day operations of all active-duty Soldiers serving at USAMRMC.

Northup is the youngest of seven children and hails from a small town in Wisconsin. He enlisted in the U.S. Army at the age of 17 and spent four years in the infantry before changing his focus to medicine where he worked as a medical logistician. In addition, Northup has spent time in Germany and Iraq, and served as the aide-de-camp to Lt. Gen. Eric B. Schoomaker and Maj. Gen. Carla G. Hawley-Bowland. In addition to his family, he takes great pride in the fact that he truly enjoys his job. He says, every job he has held has been a good one and that he has never had a bad job.

Northup's approach for his role as the company commander is one of leadership, maintenance, and care.

"Leaders are there to lead, and they should do so by acting as an example and setting the standard." He adds that it is vitally important to never lose sight of the Soldier because the Soldier is the entire reason for our work at USAMRMC.

In this new role, his primary goal will be to fulfill the USAMRMC mission by supporting the everyday activities of Soldiers so that they are able to focus on their jobs. He says this is a great opportunity to grow the Company and ensure that it is operating smoothly and effectively. Northup intends to accomplish his goal by following the rules and regulations that have been established by the U.S. Army in a straightforward and honest manner. He describes himself as a "black and white kind of guy" who will do whatever is necessary for the Company to be successful.

In his spare time, Northup enjoys spending time with his wife and daughter and maintaining an active life; he as an avid golfer and also enjoys skiing, snowboarding, and traveling.

Chelsea Bauckman
USAMRMC

WRAIR and 6MLMC Win the 2010 Surgeon General's Excalibur Award

The Surgeon General's Excalibur Award Program is designed to formally recognize teams and organizations that have implemented improvements and innovations, which have increased the efficiency and effectiveness of programs and processes within the Army Medical Department. Along with recognizing excellence, the award program promotes the long-range benefits of sharing information, good ideas, and best practices throughout the AMEDD. WRAIR won the Active Component (MEDCOM/USAMRMC) Non-MTF award category, and 6MLMC won the Active Component TO&E award category.

WRAIR Awards

December 2010

Special Act
Michael Julius

January 2011

Meritorious Civilian Service Award
Joseph Chiu

Time Off Award
Rachel Eckford

February 2011

Service Award
Elaine B. Morrison

Commander's Award
James Atkins
Sandra Simpson

Service Award
Sandra Simpson

Special Act Award
Leslie Thompson-Muldrow
Janak Rajani

Time Off Award
Leslie Thompson-Muldrow

USAMRMC Awards

December 2010

Legion of Merit
Lt. Col. Shean E. Phelps

Meritorious Service Medal
Col. Jeffrey S. Ashley
Staff Sgt. Clayton W. Coomes
Sgt. 1st Class James E. Costin
Sgt. 1st Class John D. Elam
Staff Sgt. Nyasa M. Hampton
Lt. Col. Daniel E. Jetton
Col. Arthur G. Lyons
Maj. David C. Schnabel
Master Sgt. Genaro J. Silvas
Maj. Michael J. Walter

Army Commendation Medal
Spc. David L. White

January 2011

Meritorious Service Medal
Lt. Col. John R. Bailey
Col. Ronald E. Banks
Maj. Stefan Fernandez
Sgt. 1st Class Patricia E. Mucha
Capt. Gleeson Murphy
Lt. Col. James E. Tuten
Staff Sgt. Douglas Wilson

February 2011

Meritorious Service Medal
Capt. Jarrett F. Heffner
Sgt. 1st Class Keith W. Kittle
Maj. Luis A. Lugo-Roman
Staff Sgt. Yuly Raymundo
Master Sgt. Antionette D. Watson

USAARL Awards

December 2010

Promotion
Maj. Frank Petrassi

35 Years of Service Award
Patricia Grimes

25 Years of Service Award
Dr. Leonard Temme

Commander's Award for Civilian Service
Scott Childress

Superior Civilian Service Award
Patricia Grimes
Dr. Heber Jones

Certificate of Appreciation
Staff Sgt. Jessica Anderson
Charles Brown
Patricia Grimes
Alex McKinnie
Paul Strickland
Gary Trendowicz

January 2011

Army Commendation Medal
Spc. Adam Francis
Sgt. Brad Wilson

25 Years of Service Award
Joe McEntire

20 Years of Service Award
Scott Childress

10 Years of Service Award
Dr. Melinda Hill
Gina Jurek

Certificate of Appreciation
Sandra Born

February 2011

Army Commendation Medal
Sgt. Pedro Cruz

Army Achievement Medal
Sgt. David Allen
Sgt. Craig Berlin
Spc. Dale Cmaylo
Staff Sgt. David Lopez
Spc. Adam Thompson
Lt. Col. Lynne Walters

Promotions
Maj. Ken Emerson
Chief Warrant Officer 5 Leann Fraka

Certificate of Achievement
Jeremy Athy
Jim Chiaramonte
Sgt. Pedro Cruz
Gina Jurek
Melody King
Katie Logsdon
Sgt. William McGilberry
Edna Rath
Elizabeth Stokes

Certificate of Achievement in Safety
Cpt. Michael Crivello
John Ramiccio

Certificate of Appreciation
Sgt. David Allen
Andrew Alvarado
Jeremy Athy (2)
Kevin Baugher
Sgt. Craig Berlin
Sgt. Arlene Breaux
Jim Chiaramonte
Scott Childress
Spc. Dale Cmaylo (2)
Cpt. Michael Crivello
Sgt. Pedro Cruz
Sherrie Davis
Brad Erickson (2)
Victor Estes
Lt. Col. Steve Gaydos
Jeffrey Holemo
Melody King (2)
Staff Sgt. David Lopez
Sgt. William McGilberry
Lana Milam
John Ramiccio
Dan Ranchino
Edna Rath
Ronnie Reynolds
Bennett Rock
Cpt. Nick Spangler
Mindy Vasbinder (2)
Lt. Col. Lynne Walters
Cpt. Chris Wingate (2)

USARIEM Awards

December 2010

Army Achievement Medal
Spc. Martha Alinovi

Commander's Award for Civilian Service
Donna Cardinal
Richard Langevin
Jeffrey Oliver

Special Act Award
Dr. John Castellani

On-the-Spot Award
James Bradley
Craig Brown
Lenny Bucciarelli
Lois Casey
Darlene DiCicco
Ellen Fletcher-Goetz
Laurie Gordon
Dorene Kaloustian
Daniel Kemp
Richard Langevin
Kim Tartarini

January 2011

Meritorious Service Medal
Sgt. 1st Class James Costin

Army Achievement Medal
Spc. Dennis Scofield

Promotions
Sgt. Matthew Dickson
Staff Sgt. Jay O'Hara

Reenlistment
Staff Sgt. Myissha Tompkins

Achievement Medal for Civilian Service
Jeff Evans
Lee Cummings
Yury Meylikhov

On-the-Spot Award
Ellie Bromfield

February 2011

Army Commendation Medal
Spc. Allan Colacchio

Army Achievement Medal
Spc. Reeshemah Ward
Spc. Aaron Omdahl

Promotions
Col. Rachel Evans
Staff Sgt. Bryan Wiley

Invention Award
Dr. Reed Hoyt
Dr. Scott Montain

Special Act Award
Steve Mullen

On-the-Spot Award
Adam Potter