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Navy Surgeon General Highlights Global Health Engagement in Peru

CALLAO, Peru - The U.S. Navy surgeon general and chief, Bureau of Medicine and Surgery, visited the U.S. Naval Medical Research Unit in Peru (NAMRU-6) January 9-11 to observe the global health engagement efforts conducted in the region.

"Navy Medicine's mission is one with a truly global footprint," said Vice Adm. Matthew L. Nathan. "Naval Medical Research Center, Navy Medicine's global biomedical research and development enterprise, is engaged around the globe, operating forward and providing a global health benefit around the world."

NAMRU-6, commanded by Capt. David Service, comprises 14 active-

duty service members from the Navy, Air Force and Army and 320 Peruvian scientists. The unit has the unique distinction of being the only U.S. military command in South America. Not only is the facility unique in that regard, it is also unique in the research it conducts.

NAMRU-6 conducts infectious disease research and surveillance that is of military and public health concern in the region. The research covers a wide spectrum of topics including entomology, bacteriology, virology, emerging infections and parasitology.

While visiting the houses of people who are enrolled in the NAMRU-6

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Vice Adm. Matthew L. Nathan, Navy Surgeon General and Chief, Bureau of Medicine and Surgery, thanks Capt. David Service for his outstanding command of NAMRU-6 and for 30 outstanding years of service.

Visit NAMRU-6's new blog:

<http://navymedicine.navylive.dodlive.mil/archives/4145>

NMRC Commanding Officer's Message

Readiness, Value, Jointness - Navy Medicine's Strategy Map for World Class Care - Anytime, Anywhere.

The Navy Surgeon General has charted a strategic course for Navy Medicine based on the principles of Readiness, Value and Jointness. It is imperative that all parts of Navy Medicine, including Research and Development, be aligned with these principles. I discussed the "value" of our research efforts last month, and this month I'd like to discuss "readiness."

The Naval Medical Research Center enterprise demonstrates its focus on the medical readiness of our Sailors and Marines through a diversity of research programs in environments ranging from flight operations, undersea and diving operations, extreme climates, high-explosive exposure, chemical/biological/radiological/nuclear exposure and response, and directed energy exposure. Research also focuses on optimizing a healthy and fit force throughout the continuum from initial enlistment to retirement and beyond. Examples range from NSMRL's important work on circadian rhythms and operational watch schedules aboard submarines, which were shown to improve safety and effectiveness, to NHRC's successful efforts in the licensure of the adenovirus vaccine in 2011 for use in recruit training, which appears to have already prevented more than 15,000 cases of this potentially severe infection. I'm proud to know that our research efforts are aligned with the fighting requirements of the Chief of Naval Operations and the Commandant of the Marine Corps as well as the strategic vision of the Surgeon General and I want to commend you all for the fantastic work you are doing to enhance the readiness of our Sailors and Marines.



NMRC Commanding Officer sends,
John W. Sanders III, CAPT, MC, USN



NAMRU-SA Commanding Officer's Message

A former chairman of General Electric said the core of his success was to "change before you have to." He also said his only regret was not moving faster. With the shifting financial and mission priorities in DoD, virtually everything we do here at NAMRU-San Antonio is geared toward addressing current and future needs of Navy and DoD operators as fast as possible. This involves working in a joint environment in areas of research unheard of just a few years ago, or by taking today's best practices and making them even better.

The most prevalent cause of death on the battlefield remains hemorrhage and hemorrhage-related complications. To address this issue, research within our Combat Casualty Care and Operational Medicine Directorate continues to focus on testing and evaluating products associated with hemorrhage control, including field tourniquets and blood substitutes, and research to improve en route care, such as the Patient Active Warming Systems (PAWS). Additionally, we have developed a new Immunodiagnostic and Bioassay department, whose focus is the evaluation of biomarkers associated with wound healing, wound regeneration, and microbial infections to reduce the impact of wound-related complications. These researchers are also leveraging proteomic and transcriptomic data as we push towards personalized medicine. Efforts within our Directed Energy Bioeffects and Human Systems Integration Department focus on evaluation of lasers for medical use as well as their effects on human performance, including motion perception and cognitive function.

Researchers within our Craniofacial Health and Restorative Medicine Directorate are currently developing therapeutic approaches to treat maxillofacial injuries and infections using nanosecond pulsed laser energy combined with gold nanoparticles technology. These studies include work aimed at targeted treatment of maxillofacial infections associated with antibiotic-resistant bacteria, including Methicillin-resistant *Staphylococcus aureus* (MRSA). Other investigators are working collaboratively with researchers at the Naval Postgraduate Dental School's 3D Medical Applications Center to develop antimicrobial nano-delivery systems that can be used in combination with customized implants to replace lost maxillofacial tissue in wounded warriors with the goal of reducing post-surgical complications and improving medical outcomes.

Work currently being done at NAMRU-San Antonio is focused on ways to enhance the health, safety, performance and operational readiness of Navy and Marine Corps personnel while working diligently to leverage expertise present in our sister services here at San Antonio Military Medical Center.

NAMRU-SA Commanding Officer sends,
Rita G. Simmons, CAPT, Ph.D., MSC, USN

Navy SG's Video Highlights Navy Medicine's Priorities for 2013

FALLS CHURCH, Va. - The Navy Surgeon General publicly released a video January 15, detailing his priorities for the Navy Medicine enterprise moving into the New Year and beyond.

The video is posted on the Navy Medicine YouTube site: <http://www.youtube.com/watch?v=49MaUXJVyts>.

The video is also available for download on the Surgeon General's Corner on the Navy Medicine website: <http://www.med.navy.mil/leadership/sgvisits/Pages/default.aspx>.

The priorities, which are readiness, value, and jointness, were developed and fine-tuned by senior officer and enlisted Navy Medicine leadership throughout a series of workshops held in 2012.

In the video message to his 63,000-person organization, Vice Adm. Matthew L. Nathan, U.S. Navy surgeon general and chief, Bureau of Medicine and Surgery, explains each of the priorities and what they mean for the future of Navy Medicine and the environment the organization is operating in today.

Nathan emphasized the importance of readiness, not only of his own Navy Medicine personnel, but also the importance of their role in maintaining the readiness of the Fleet.

"Readiness is job one," said Nathan. "We provide world-class care, anytime, anywhere. It is our hallmark, our ethos, so we've got to be sharp, on point to do what's necessary to maintain that readiness."

Nathan also acknowledged the current fiscal constraints and the realities facing the military health care industry today and what he believes must be done to successfully maneuver it without impacting the quality of care.

"In today's fiscal resource conservation, we've got to

look for the value in all we do," he said. "Let's evaluate everything we do, especially as we transition to operating in a peacetime care dynamic. We've got to be razor-sharp in quality, efficiency and value and we need to be thinking about this all the time."

Nathan's final priority recognizes the move toward a more joint environment and aims to capitalize on the strengths of these joint opportunities.

"Jointness is key," Nathan said. "There's more strength together than there is apart. We're finding the synergy with our sister services and other partners. We're sharing what we know and learning what others know and building a better team together. That's critical."

Nathan's goal is for every member of the Navy Medicine team - from the doctors, nurses and health care administrators at a medical treatment facility to an independent duty corpsman on a submarine - to know and recognize not only the priorities of Navy Medicine, but also how each of them relates to his or her own job.

"I am looking to my leaders on the officer, enlisted, civilian and contract levels to all engage with their folks and relate these priorities to their commands and jobs," he said to his staff upon release of the video. "Open and transparent communication is a leadership imperative and an expectation I have of all my team members."

Nathan leads a global health care network of more than 63,000 Navy medical personnel around the world who provide high-quality health care to more than one million eligible beneficiaries. Navy Medicine personnel deploy with Sailors and Marines worldwide, providing critical mission support aboard ship, in the air, under the sea and on the battlefield.

NAMRU-D Receives Excellence Award from 711th HPW Director

DAYTON - On January 25 the Naval Medical Research Unit Dayton ([NAMRU-Dayton](#)) received an excellence award from Brig. Gen. Timothy Jex, director, U.S. Air Force 711th Human Performance Wing (HPW). NAMRU-Dayton demonstrated exceptional partnership with the 711 HPW in the accomplishment of mutual missions. Most notably, NAMRU-Dayton contributed critical leadership and expertise as part of a comprehensive scientific, medical and technical response to Air Force concerns about the F-22 on-board oxygen generation system. The teamwork between NAMRU-Dayton and 711 HPW at every level was instrumental to the success of that response and has earned rave reviews from Air Force and Office of the Secretary of Defense senior leaders. Under the leadership of NAMRU-Dayton's commanding officer, Capt. Doug Forcino, partnership with the 711 HPW rose to new heights over the past year, underscoring the wisdom of the original BRAC 2005 vision and enabling new synergies for delivering world-class human performance solutions to the joint warfighter.



Brig. Gen. Timothy Jex, director, USAF 711th HPW (left), presents the Excellence Award to Capt. Doug Forcino (center), commanding officer of NAMRU-Dayton.

A Time-honored Naval Tradition with a 21st Century Twist: Capt. George Schoeler Says Goodbye as NAMRU-2 CO Via VTC

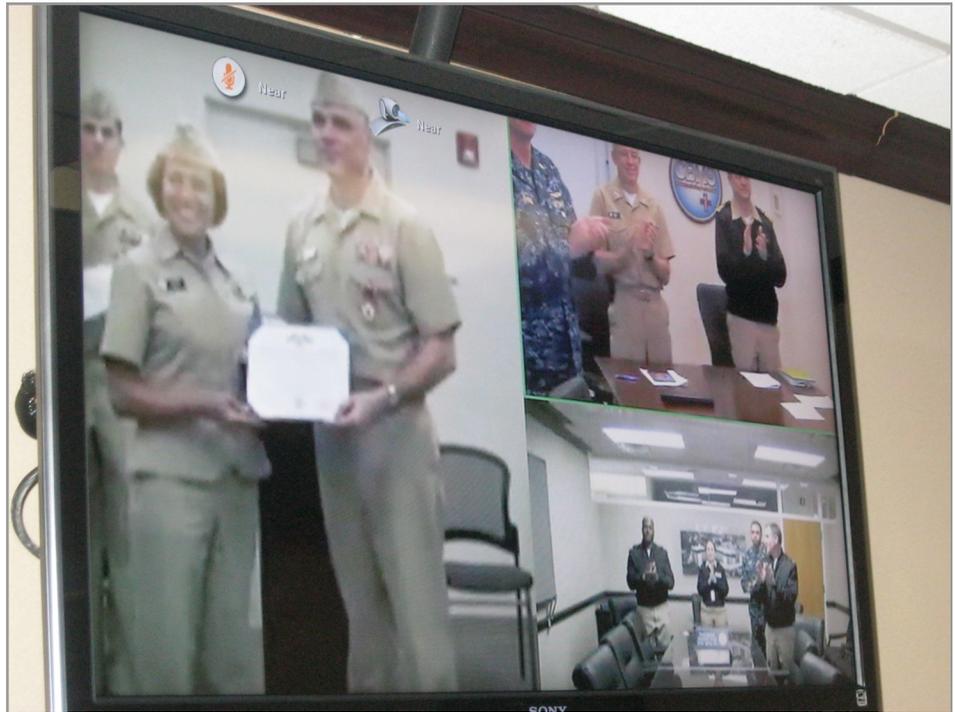
By Lt. Cmdr. Dustin Harrison

PEARL HARBOR, Hawaii - Capt. George Schoeler stepped down as U.S. Naval Medical Research Unit No. 2 Pacific (NAMRU-2) commanding officer January 18, turning command over (temporarily) to the Executive Officer, Capt. John Gilstad, in a rather unprecedented fashion – via video teleconference (VTC).

Schoeler made the decision to leave NAMRU-2 following his appointment as Deputy Director of the Medical Service Corps, where he will work for Rear Adm. Terry Moulton. Schoeler only spent one year at the NAMRU-2 helm. Gilstad will take temporary charge of the command as NAMRU-2 awaits Schoeler's permanent replacement, Capt. Carlos Lebron, currently the commanding officer of the Navy Drug Screening Laboratory in Jacksonville, Fla. Lebron will assume command of NAMRU-2 sometime in May or June.

In a time of heightened fiscal awareness with dwindling budgets and more restrictive travel caps, the decision was made to host a change-of-command ceremony via VTC, spanning the globe between Pearl Harbor, Hawaii, and Ft. Detrick and Silver Spring, Md. It was a first for Navy Medicine and was a complete success. The VTC was an intimate affair, with only the NAMRU-2 command, the wives of Schoeler and Gilstad, and a special visit by U.S. Pacific Command Surgeon Rear Adm. Raquel Bono in attendance in Hawaii. Navy Medicine Research and Development Command/Bureau of Medicine and Surgery Deputy Chief of Research and Development Rear Adm. Bruce Doll, Naval Medical Research Center (NMRC) commanding officer Capt. John Sanders, and others linked in from Maryland.

"We are very grateful to Capt. Schoeler and the crew of NAMRU-2 for devising this unique change of command ceremony. They recognized
(Continued on page 15)



Capt. George Schoeler receives an award from U.S. Pacific Command Surgeon Rear Adm. Raquel Bono (left side of screen). Right side, top: Rear Adm. Bruce Doll and Capt. John Sanders. Right side, bottom: NMRC staff.



NMRC signs on to the change of command ceremony via VTC. From left: Lt. Cmdr. Nathaniel Smith, Capt. Elizabeth Montcalm-Smith, Lt. j.g. Kevin Brown, and Capt. Eric Hall.

Rear Admiral Chinn Tours Naval Medical Research Unit San Antonio

FORT SAM HOUSTON, Texas - Rear Adm. Colin G. Chinn, director of the Medical Resources Plans and Policy Division, Office of the Chief of Naval Operations, and chief, Navy Medical Corps, toured Naval Medical Research Unit San Antonio (NAMRU-San Antonio), was briefed on several of the unit's current projects and met many of the researchers and staff.

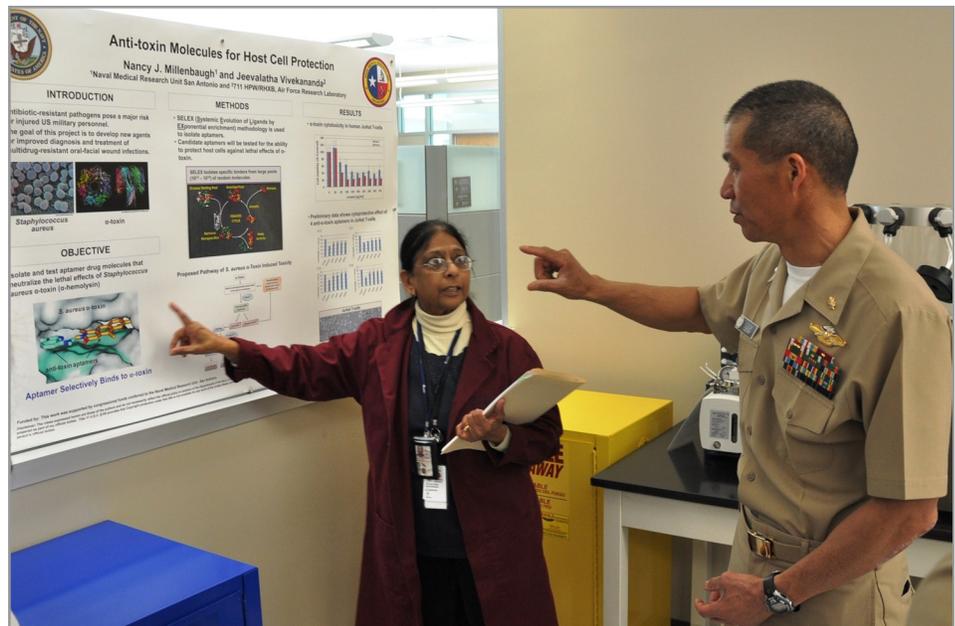
During the visit, the admiral told NAMRU-San Antonio's staff about the importance of their research and development work and how he, in his current position, supports what they do.

"I advocate for you in the Pentagon and at the Bureau of Medicine and Surgery, so having this opportunity to see firsthand what you do is important to me," said Chinn. He explained that the Navy's senior medical professionals and staff are looking to build on the Combat Casualty Care advances developed during the last ten years of war in Iraq and Afghanistan.

"Virtually everything we do here at NAMRU-San Antonio is geared toward addressing the needs of Navy operators and operators of other military services out in the field," said Capt. Rita G. Simmons, commanding officer of NAMRU-San Antonio. "This includes capitalizing on our unique setting of working alongside, and in conjunction with, the Army and Air Force research and development organizations, as well as with our academic partners here in San Antonio."

One of the many areas briefed to the admiral was NAMRU-San Antonio's work with aptamers and novel antimicrobial therapeutics.

"We are utilizing aptamer-based technology for the detection and treatment of broad-spectrum antibiotic resistant microorganisms," said Dr. Rene Alvarez, director of Combat Casualty Care and Operational Medicine at NAMRU-San Antonio. "In addition to this, we are leveraging proteomic and transcriptomic data for the identification of biomarkers associated with wound healing and tissue regeneration."



Dr. Jeevalatha Vivekananda, a research scientist with NAMRU-San Antonio, explains the findings of her anti-toxin project to Rear Admiral Colin G. Chinn during a recent tour. Other areas shown to the Admiral during the tour included mercury abatement procedures, work with novel antimicrobial therapeutics, and the Patient Active Warming System project.

As part of the tour, Alvarez showed Chinn some of the procedures in the laboratory currently being evaluated for use under field conditions and also introduced him to many of the scientists and technicians working on the projects.

During a portion of the briefing, the admiral emphasized the importance of NAMRU-San Antonio's research to the future of Navy Medicine.

"Our leaders understand that hemorrhage control is vital to our future," he said.

While touring the labs, Chinn was shown the latest developments in testing potential new field tourniquets. He was also introduced to the Patient Active Warming System (PAWS) being developed for the Navy and Marine Corps. Lt. Cmdr. Anne McKeague, program manager for Medical Test and Evaluation, Combat Casualty Care Department, had several examples of the latest devices being evaluated for NAMRU-San Antonio sponsors.

"The PAWS and field tourniquets tested have shown distinctive im-

provements from devices being used in the field right now," said McKeague. "We were glad to show the admiral not only the devices themselves, but also give him an opportunity to meet and talk with many of our staff members who are working on these programs."

Other research initiatives shown to the admiral during the tour included mercury abatement procedures developed to ensure compliance with environmental requirements in Navy and Department of Defense dental treatment facilities, directed energy developments using lasers to better protect operators in the field, and NAMRU-San Antonio's veterinary sciences capabilities.

NAMRU-San Antonio's mission is to conduct medical, dental and directed energy biomedical research that focuses on ways to enhance the health, safety, performance and operational readiness of Navy and Marine Corps personnel and addresses their emergent medical and dental problems in routine and combat operations.

NAMRU-3 Establishes New Relationship with USAMRU-Kenya

CAIRO, Egypt - To strengthen “jointness” with Department of Defense medical research laboratories in Africa, the U.S. Naval Medical Research Unit No. 3 (NAMRU-3) has taken steps to establish a new relationship with the U.S. Army Medical Research Unit Kenya (USAMRU-K). In October 2012, NAMRU-3 invited Lt. Col. Eyako Kofi Wurapa, director of the Department of Emerging Infectious Diseases at USAMRU-K, and Berhane Assefa, the deputy director, to visit NAMRU-3 to discuss efforts to strengthen togetherness in research and avoid duplication of efforts, thereby saving time and cost and enhancing mission readiness.

Col. Tom Logan, USAMRU-K commanding officer, reciprocated with an invitation to Capt. Buhari Oyoyo, NAMRU-3 commanding officer, and Lt. Cmdr. Jennifer Curry, research science director, for a follow-up visit to the USAMRU-K facilities in Kenya, January 14-17. The visit kicked off with an exchange of command briefs to better define the capabilities and current projects of the two laboratories. Other command-level interests were contract staff utilization, integra-



From left: Capt. Buhari Oyoyo, NAMRU-3 commanding officer, and Lt. Cmdr. Jennifer Curry, research science director, meet with Col. Tom Logan, commander, USAMRU-K. Photo by Lt. Col. Eyako Kofi Wurapa.

tion with the Centers for Disease Control and Prevention (CDC) and local medical research institutions, procurement routes and overhead costs with an eye toward the flexibility

afforded by different management structures in the face of budget uncertainty, travel expenditure caps and conference approval requirements.

Oyoyo commented, “The organization of USAMRU-K was very interesting, with the headquarters embedded at the Kenya Medical Research Institute (KEMRI), much like the NAMRU-3 Ghana Detachment, which is embedded at the Noguchi Memorial Institute of Medical Research in Accra, Ghana. I was impressed that there was no duplication of lab activities, even though there are various working sites.”

Over three days, Wurapa and Assefa gave Oyoyo and Curry a tour of the working sites. They first visited Kisumu, which has been active in vaccine and treatment trials for HIV and malaria. At Kisumu’s Kombewa Clinical Research Center there is a population-based cohort similar to the NAMRU-3 population-based surveillance in Damanhour, Egypt. The nearby laboratory spaces at the Kisian complex (which also houses the

(Continued on page 7)

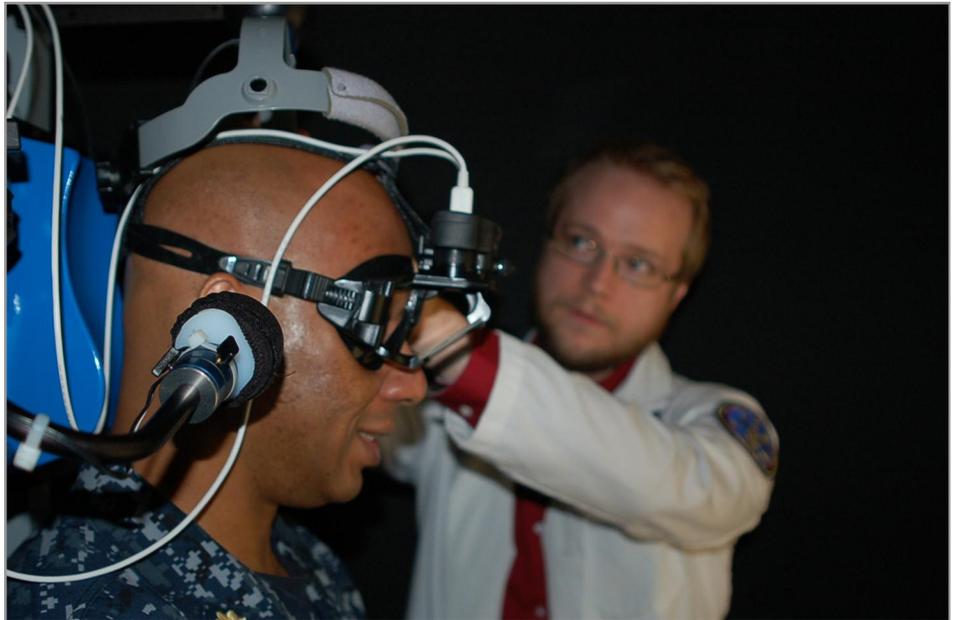


From left: Lt. Cmdr. Curry, Maj. Bast, and Lt. Col. Wurapa visit the Kisian Complex at Kisumu. Photo by Capt. Buhari Oyoyo.

NOTC Helps Combat Motion Sickness, Spatial Disorientation

DAYTON, Ohio - The Naval Medical Research Unit Dayton's ([NAMRU-Dayton](#)) Neuro-Otologic Testing Center (NOTC) is a key capability for the lab's motion sickness and spatial disorientation research programs. This device is a state-of-the-art clinical vestibular rotating chair capable of three degrees of motion (rotation on axis, tilt, and horizontal translation) and housed in a light-tight enclosure. The NOTC has cutting-edge technologies that enable pre-programmed and custom tests of visual and vestibular function during rotation, including head-mounted eye-tracking and an opto-kinetic sphere for projection of a visual field within the enclosure. Currently, two NAMRU-Dayton projects are utilizing the NOTC.

The first project, funded by the Navy Bureau of Medicine and Surgery, is a Food and Drug Administration Phase II clinical trial of intranasal delivery of the motion sickness countermeasure scopolamine. Scopolamine is the most effective medication for the prevention of motion sickness; however, current administration routes have drawbacks that can compromise its operational utility. When administered via a transdermal patch, scopolamine is absorbed slowly and can have high-dosing side effects; when administered via an oral pill, the medication can be lost due to vomiting. Intranasal delivery of scopolamine (INSCOP) in an aqueous spray may speed absorption while reducing the minimum effective dose. NAMRU-



Setting up the NOTC's head-mounted eye-tracking feature.

Dayton scientists are using the NOTC to induce motion sickness in volunteers via off-vertical rotation, after which they compare the amount of motion sickness tolerated when participants receive INSCOP versus placebo.

The second project is a neuro-imaging study investigating the basic neural processes underlying normal human spatial orientation; this project represents the first step of a line of research that seeks to better understand pilot spatial disorientation. Using advanced 256-channel dense array electroencephalography (dEEG) technology, NAMRU-Dayton scientists

are measuring spatial neurological functions during combinations of visual tracking tasks and vestibular stimulation created by the NOTC. High-resolution dEEG signals will be reconstructed in three-dimensional space and localized to specific anatomical brain structures, allowing visual and motion influences on spatial processing to be differentiated. Further refining the role of the vestibular system with regard to activation of specific brain cells will enhance understanding and modeling of human spatial processing and lead to improved flight simulation training and reduced spatial disorientation in the Fleet.

NAMRU-3 Establishes New Relationship with USAMRU-Kenya

(Continued from page 6)

largest Centers for Disease Control and Prevention contingent outside of Atlanta) hold the USAMRU-K Entomology and Malaria Diagnostic/Malaria Drug Resistance programs. Finally, at Kericho, which is located approximately two hours from Kisumu, the NAMRU-3 team toured state-of-the-art facilities at the "Microbiology Hub" reference lab and the Kericho District Hospital labora-

tory. Both College of American Pathology certified labs are run under the same management, resulting in optimization of diagnostic capabilities and support.

NAMRU-3 and USAMRU-K already partner in multi-center trials funded by the Global Emerging Infections Surveillance and Response System and the Military Infectious Diseases Research Program, but hope to develop more joint protocols

specific to the U.S. Africa Command (AFRICOM) region in the near future.

"This visit was an important step in opening up serious dialog on jointness with USAMRU-K, with NAMRU-3 looking forward to extending its role in assisting AFRICOM," Oyofu said.

This initiative by both commanding officers also supports the Surgeon General's goals for *Jointness, Value and Readiness* in their respective missions on the African continent.

Assessing Enhanced Immersive Training for Hospital Corpsmen

By NHRC Public Affairs

SAN DIEGO - There is a loud shot, and then a streaking rocket from across the street hits a building with an explosion near a group of Marines on foot patrol. A Marine is down, his leg severed at the thigh. He is screaming in agony while fellow Marines and corpsmen move him inside the building and begin treating his wounds. They work to apply a tourniquet and check for other shrapnel wounds, discovering a severe chest wound that is inhibiting breathing. The scene is not Afghanistan, but Camp Pendleton. The Marines are mostly students from Fleet Medical Training Battalion – West (FMTB-W) Fleet Medical Service Technician class. In the FMTB-W mock village, these students are completing their final exercise before graduating. The “immersive” training, which includes pyrotechnics, role players, and body-worn wound-simulator suits, is being evaluated by the Naval Health Research Center (NHRC) under sponsorship of the Bureau of Medicine and Surgery (BUMED) Wounded, Ill, and Injured program office.

“The idea for this effort came from what I observed at the Infantry Immersive Trainer [IIT] at Camp Pendleton,” explains Dr. Karl Van Orden, NHRC’s director of research and development and the project lead. “The IIT is used to train infantry squads in the tactics, techniques and procedures of operating within the Afghanistan village environment. It’s considered by many to be the best pre-deployment training infantry Marines receive. The IIT has a very realistic environment with role players, RPGs, IEDs, and small arms fire. The idea behind the IIT was to give Marines a taste of asymmetric and irregular combat before they got into theater. We started looking at mental resilience within the IIT several years ago, and given the significant stressors faced by Navy corpsmen assigned to infantry units, I thought that we should try some of this technology on corpsmen in order to better prepare them for the battlefield.”

NHRC sought to identify the appropriateness, feasibility, and cost associated with this type of training and solicited the support of Booz Allen Hamilton (BAH) to help answer those questions.

Serendipitously, Strategic Operations Inc., which built and supports the IIT, had begun designing and building body-worn medical trauma simulator suits (called “Cut Suits”) and very lifelike medical training mannequins. Strategic Operations is a spin-off company of Stu Segal Productions, a San Diego movie studio that brings Hollywood technology to the military, police and now medical training environments. When worn by a role player/actor, the Cut Suit and severed thigh, which bleeds profusely, make for a highly compelling and immersive situation for the corpsman.

An analysis of various training venues and plans of instruction by BAH brought NHRC to FMTB-W, where throughput in terms of number of students is fairly high and



Hospital corpsmen participate in infantry immersive training at Camp Pendleton.

such training might be cost effective. Three exercises have now been completed, earning high praise from both students and instructors.

“Great special effects! Outstanding! Best training I have seen delivered to the students in the one and a half years that I’ve been here,” remarked one of the FMTB-W instructors.

Students have also been very positive. The cost per student for the enhanced training is actually quite reasonable, given the class sizes at FMTB-W. Capt. Mike Eby, commanding officer of FMTB-W, has discussed long-term operational support for the enhanced training with U.S. Marine Corps Training and Education Command leadership.

Having established feasibility and cost of the enhanced training at a large training venue like FMTB-W, NHRC now plans to examine the use of enhanced immersive training in the Surface Warfare Medical Institute (SWMI) Independent Duty Corpsman course (Corpsman designation 8425). Although the number of students is much smaller than at FMTB-W, SWMI is attempting to replace the trauma treatment and care training, which uses an animal model that is quite costly and controversial. The skills that need to be mastered leading to the 8425 designation are much greater than those of an 8404.

“We are eager to move in this direction and use the Cut Suits and other enhancements. This approach may actually allow more of our IDC students to get ‘hands-on’ training in our final class evolution,” stated SWMI’s officer in charge, Capt. Steve Banks.

“We’re also going to try and look at skills mastery,” explained Van Orden. “That’s the million dollar question. At the end of the day, will this type of enhanced training lead to better performance on the battlefield? Everyone believes that it will, but it would be nice to have some objective data to support that.”

Focusing on Human Movement to Determine Dengue Transmission

From NAMRU-6 Public Affairs

LIMA, Peru - To stop the transmission of dengue virus (DENV), a mosquito-borne pathogen that threatens more than three billion people worldwide, it is crucial to focus on human movement, not just the traditional mosquito control and prevention methods, say authors of ground-breaking research published December 31, 2012 in the *Proceedings of the National Academy of Sciences*. Dengue disease is now endemic in more than 120 countries and heavily impacts Asia, the Caribbean and Latin America. Recent outbreaks have also occurred in Africa and Florida.

In a two-year study of DENV transmission in Iquitos, Peru, a 13-member team found that human movement, people going from house to house to visit friends and relatives, is a key component to driving virus transmission.

"This finding has important implications for dengue prevention, challenging the appropriateness of current approaches to vector control," said lead author Steven Stoddard, a medical entomologist from the University of California-Davis.

The research team included scientists from UC-Davis; the U.S. Naval Medical Research Unit No. 6 (NAMRU-6); San Diego State University; University of Iowa; Tulane University, New Orleans; and Emory University, Atlanta.

The article, "House-to-house human movement drives dengue virus transmission," compared DENV-infected individuals with those possessing a fever not caused by DENV. An individual's movement pattern, termed activity space, was collected and used to locate individuals who were also present in the activity space during the time of illness. The findings showed those sharing an activity space with a DENV-infected individual had a greater chance of also being infected with DENV than those who shared an activity space with a non-DENV-infected individual. The results also showed that infection risk was driven



The 6 de Octubre Health Center in the Belen district of Iquitos, Peru.

more by contacts in one's activity space and not merely by those living in close proximity.

Dengue was a major cause of illness in U.S. soldiers during World War II and also impacted the fighting force in the Vietnam War. More recently, DENV infection has affected missions in Somalia, the Philippines and Haiti. U.S. Navy overseas laboratories remain pioneers in dengue research. Currently, efforts at the NAMRU-6 site in Iquitos, Peru, focus on epidemiology, mosquito control strategies, rapid diagnostics and transmission dynamics. NAMRU-6 study members included Lt. Col. Eric Halsey, Lt. Cmdr. Tadeusz Kochel, Brett Forshey, Helvio Astete, Stalin Vilcarromero and Amy Morrison.

"This was a multi-year endeavor that relied heavily on the input of a wide array of scientists from different disciplines," commented Halsey.

In a two-year study of DENV transmission in Iquitos, Peru, a 13-member team found that human movement, people going from house to house to visit friends and relatives, is a key component to driving virus transmission.

The research team included entomologists, social scientists, disease modelers and physicians and was supported by funding from the National Institutes of Health, the Military Infectious Diseases Research Program and the Global Emerging Infections Surveillance and Response System.



Human movement on the streets of Iquitos, Peru.

NAMRU-3 CO Visits Ghana, Discusses Regional Collaboration

CAIRO - Capt. Buhari Oyoyo, Naval Medical Research Unit No. 3 ([NAMRU-3](#)) commanding officer, accompanied by Capt. John Crawford, Veterinary Corps, U.S. Army, visited Accra, Ghana, January 9-13. The purpose of the visit was to hold discussions with the Noguchi Memorial Institute of Medical Research (NMIMR) and the Ghana Medical Services on current and future collaborations in order to strengthen the ongoing relationships in the region and future expansion of regional capacity building. These meetings also provided Crawford the opportunity to become familiar with the region in order to understand and provide support to ongoing activities in Ghana and neighboring countries, such as Burkina Faso, Côte d'Ivoire and Togo.

Professor Kwadwo Koram, director of NMIMR, and Dr. William Ampofo stated that they were very happy with their collaborations with NAMRU-3. There was a very important roundtable discussion on how best to tackle the multiple sites of the U.S. Department of Defense Global Emerging Infectious Surveillance and Response System (DoD-GEIS) malaria study, which will begin in Ghana, Kenya, Thailand and Peru.

Cmdr. Christopher Duplessis, head of the NAMRU-3 Ghana Detachment, accompanied Oyoyo and Crawford to meetings with Commodore Roland Sowa, director of the Ghana Medical Services, and his deputy, Col. Bel Nono. These meetings were held at Burma Camp military headquarters. Lt. Cmdr. Edward Nyarko, military-to-military coordinator of the Ghana Medical Services, gave a presentation on the shared mission, specifically on severe acute respiratory infections and acute febrile infections.

Another element of the visit was a meeting with Patricia Alsup, the Deputy Chief of Mission at the U.S. Embassy in Accra. During this meeting, Oyoyo expressed his appreciation for the embassy staff's ongoing support of the NAMRU-3 Ghana Detachment. He also discussed the need for human resources/staffing, financial management and acquisition support.



From left: Col. Bel Nono and Capt. Buhari Oyoyo during visit to Burma Camp, Ghana Military Services. Photos provided by NAMRU-3 PAO.



From left: Lt. Cmdr. Edward Nyarko and Capt. Buhari Oyoyo discussing NAMRU-3 Ghana Det projects at Burma Camp, Ghana Military Services.

Update on NAMRU-Dayton's Disorientation Research Device

By Roy Dory

DAYTON, Ohio - The design build of the Disorientation Research Device (DRD) at the Naval Medical Research Unit Dayton ([NAMRU-Dayton](#)) is in its final stages, with completion slated for early spring 2013. The device, built by Environmental Tectonics Corporation (ETC), Philadelphia, Pa., will be the newest in NAMRU-Dayton's arsenal of motion-based platforms and will offer an unparalleled ability to replicate motions generated in current and future-generation aircraft. All major device hardware components are currently installed, and ETC has made significant progress configuring and testing more than twenty motors that drive the DRD's six axes of motion. ETC's final installation efforts are focused on completing individual axis testing and characterizing and refining device performance during combined axis motion.

Once complete, the state-of-the-art DRD will afford NAMRU-Dayton researchers the ability to orient individuals in any direction relative to a precisely controlled, dynamically changing acceleration environment and synchronize those motions with



Roy Dory (right) discusses the capabilities of the DRD with Gen. (ret.) Gregory Martin, USAF Scientific Advisory Board Chairman, during a recent NAMRU-Dayton collaborated tour with Wright-Patterson Air Force Base's 711 Human Performance Wing.

high fidelity visuals in the cockpit. The DRD generates motion in six distinct degrees of freedom, but can also produce sustained accelerations of up to 3G. While most motion simulators

utilize a single motion cueing strategy to replicate the forces generated during flight, the DRD's unique motion space will allow NAMRU-Dayton researchers to employ multiple motion cueing strategies and tailor the device's motion response to specific flight scenarios or even flight maneuvers to provide the most realistic flight environment possible.

The DRD generates motion in six distinct degrees of freedom, but can also produce sustained accelerations of up to 3G.

By realistically simulating aircraft motion, this one-of-a-kind device will allow NAMRU-Dayton scientists to identify and better understand physiologic stressors unique to the flight environment that contribute to spatial disorientation and the loss of situational awareness.



Disorientation Research Device.

NMRC a Winner of Award for Excellence in Technology Transfer

SILVER SPRING, Md. - The Award for Excellence in Technology Transfer is presented annually by the Federal Laboratory Consortium (FLC) for Technology Transfer. The award recognizes laboratory employees who have accomplished outstanding work in the process of transferring a technology developed by a federal laboratory to the commercial marketplace.

The Naval Medical Research Center (NMRC) was selected as a winner of the 2013 award for their development of the "Adhesin-based Vaccine against Enterotoxigenic *Escherichia Coli* (ETEC) Travelers' Diarrhea." Capt. Stephen Savarino and colleagues at NMRC created the vaccine against the diverse ETEC bacteria, a leading cause of travelers' and childhood diarrhea.

Patent applications were filed by NMRC's Office of Counsel for two

technologies covering the vaccine, one owned exclusively by the Department of the Navy (DON), and the other co-owned with the University of Colorado, to protect the DON's intellectual property. These applications are currently pending in the United States and various foreign countries. A patent application for a third ETEC vaccine technology, owned by the DON, was also recently filed. The NMRC Office of Technology Transfer negotiated a Cooperative Research and Development Agreement (CRADA) with Sanofi-Pasteur, a large pharmaceutical company, to accelerate development of the vaccine through a collaborative effort. In tandem with the CRADA, the vaccine technology was also licensed to Sanofi-Pasteur. This technology is also undergoing trials with human subjects, which has been permitted by



Capt. Stephen Savarino.

the Food and Drug Administration.

NMRC will be recognized at an award ceremony April 25 at the FLC national meeting in Westminster, Colo.

Former NMRC Executive Officer Capt. Eileen Villasante Retires

SILVER SPRING, Md. - Capt. Eileen F. Villasante's retirement ceremony was held February 1 at the Naval Medical Research Center (NMRC). Guest speaker Dr. Stephen Hoffman spoke about his connection to Villasante, describing the great work she did throughout her Navy career. Villasante shared snippets of that career

through a slide show depicting her in different regions of the world.

Villasante earned a B.S. degree from the State University of New York in Albany and a Ph.D. in biology from the University of Notre Dame. Prior to joining the Navy as a commissioned officer, she was a National Research Council postdoctoral fellow in the Leishmaniasis laboratory at the Walter Reed Army Institute of Research.

Her first assignment was at the [U.S. Naval Medical Research Unit No. 2](#) in Jakarta, Indonesia, where she headed the Parasitology and Immunology departments. She then reported to the Naval Medical Research Institute Detachment in Lima, Peru to be the head of the Parasitology department and conducted research on malaria and leishmaniasis. Over the years, her assignments led her to the Naval Medical Research Institute, the [U.S. Naval Medical Research Unit No. 3](#), NMRC, the U.S. Army Medical Materiel Development Activity, the U.S. Army Medical Research and Materiel Command, and the Bureau of Medicine and Surgery.

At BUMED, Villasante established and led the Department of the Navy Human Research Protection Program. She spearheaded a major revision of the U.S. Navy's policy for human research protection program to oversee all Navy-supported human subject research critical to the development of Navy/Marine Corps warfighting capabilities.

Her next assignment returned her to Silver Spring, Md., where she served as NMRC's executive officer. Currently, Villasante is the head of NMRC's Malaria Department, where she is responsible for overseeing research and development of vaccines to prevent malaria morbidity and mortality in military personnel and in vulnerable populations for the benefit of global public health. She has authored and co-authored over 40 publications in parasitology and maintains membership in the American Society of Parasitologists, the American Society of Tropical Medicine and Hygiene, the Helminthological Society of Washington, and Sigma Xi Scientific Research Society.



Capt. John Sanders, NMRC commanding officer (left), and Capt. Eileen Villasante at her retirement ceremony.

Researcher Presents Latest Advancements on “Humanized Mouse”

SILVER SPRING, Md. - A long-standing goal of scientists developing new vaccines for the warfighter has been to replace clinical trials using human subjects with a surrogate mouse model. In the first Infectious Diseases Directorate seminar of 2013, Dr. Wathsala Wijayalath described to a rapt audience the latest advancements in the Naval Medical Research Center's (NMRC) “humanized mouse” – a novel technology that is designed to do exactly that.

The mice, called DRAG mice, have white fur and pink ears and resemble ordinary laboratory mice; what is different is that they harbor a functioning human immune system.

In procedures developed in the laboratory of Dr. Sofia Casares, principal investigator in the Malaria Department, DRAG mice have been altered genetically to lack a mouse immune system. These immune-deficient animals are infused with stem cells from human umbilical cord blood. After several weeks, the mice develop normal levels of lymphocytes and other immune cells. These cells are fully human instead of being “mouse.”

In addition, DRAG mouse DNA has been altered to express a human immune molecule called DR4. DR4 promotes the normal development and function of the transplanted human immune cells.

Casares and Wijayalath, along with colleagues Dr. Sai Majji, Dr. Yuliya Kleschenko, and Rebecca Danner, have shown that the DRAG mice possess remarkable properties.

- They can be immunized with tetanus toxoid and develop



From left: Dr. Yulia Kleschenko, Capt. Thomas Richie, Dr. Sai Majji, Dr. Wathsala Wijayalath, Dr. Sofia Casares (principal investigator), and Rebecca Danner.

human antibodies to tetanus.

- They can be infused with *P. falciparum* malaria sporozoites, which develop in the liver and blood and can then be transmitted to mosquitoes, completing the life cycle of a human malaria parasite in a mouse.
- They can be used to generate fully human monoclonal antibodies against any antigen, opening a doorway to passive immunization against dangerous human pathogens.

Casares, who has been working on this model for 15 years, said, “I am very proud of my team, Wathsala, Sai, Yuliya and Becky; they are realizing our dream of developing a transformative technology for human medicine.”

Capt. Thomas Richie, head of the Malaria Department and a strong supporter of Casares’ work, added, “One day, we hope this model will replace clinical trials and allow us to develop new vaccines and drugs without putting human research subjects at risk.”

NAMRU-Dayton, 711th HPW/RHDJ Meet to Build Foundation for Collaboration

DAYTON - The Naval Medical Research Unit Dayton (NAMRU-Dayton) and the 711th Human Performance Wing (HPW)/Behavioral Systems (RHDJ) met January 24 so principal investigators and management from each organization could present key research areas and projects as a means of developing a better understanding of the capabilities of each group, as well as to serve as a basis for future collaborative efforts. Overviews of the scientific programs were presented by Dr. Schlager

(branch chief of RHDJ), Capt. Forcino (NAMRU-Dayton commanding officer), Dr. Arnold (aeromedical director) and Dr. Gargas (toxicology director), followed by presentations from various principal investigators from each organization regarding specific studies and/or programs. Tours of the Air Force laboratories, the NAMRU-Dayton toxicology facilities and the aeromedical laboratories were also conducted throughout this day-long function.

NAMRU-6 Collaborates on Rabies Study in Peruvian Amazon

LIMA, Peru - Peru has become a hotspot for human rabies cases in recent years, with most cases linked to vampire bat (*Desmodus rotundus*) exposure. Rabies disease has previously been thought to be nearly 100 percent fatal, with only a handful of case reports describing survival in those with partial prior vaccination or those receiving experimental medication combinations. However, recent evidence published in the American Journal of Tropical

Medicine and Hygiene in August 2012 challenges this old paradigm.

In May 2010, a team from the U.S. Centers for Disease Control and Prevention (CDC), the Peruvian Ministry of Health, and the Naval Medical Research Unit No. 6 (NAMRU-6) visited two towns in the Datem del Marañon Province, deep in the Peruvian Amazon, and administered a survey and obtained blood samples from the local

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Dr. V. Alberto Laguna.

Navy Surgeon General Highlights Global Health Engagement

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ovitrapp study in Iquitos, Peru, Nathan observed mosquito collection activity.

U.S. Air Force Lt. Col. Eric Halsey, head of the NAMRU-6 virology department, described the research and ovitrapp study occurring in Iquitos.

"Ovitraps are devices that kill the mosquito that spreads the dengue virus and her eggs," said Halsey. "We visit each house periodically to assess for the presence of live mosquitoes and to inquire whether people in the house have been sick recently. We compare data collected from the ovitrapp houses to houses that do not have ovitraps."

Nathan emphasized the importance of the research being done by the worldwide naval medical research centers, labs and units and the direct impact on the health and readiness of Navy and Marine Corps personnel, joint partners, and the world's population.

"Infectious disease is one of the world's greatest killers," said Nathan. "Our troops are at more risk from disease than they are from bullets and bombs. What you do here makes a difference in keeping all of our service members healthy, infection-free and medically ready."

Nathan toured the Peruvian Naval Medical Center, located in Callao, Peru, and met with his Peruvian counterpart, Rear Adm. Eduardo Novoa, director of the center. This flagship hospital was designed by the

same architect and is identical to her sister hospital, Naval Hospital Beaufort, located in Beaufort, S.C.

Nathan thanked the NAMRU-6 personnel for the difference they are making in the world and for being ambassadors of global health engagement.

"I thank you for the friendships and partnerships you are creating and nurturing here," said Nathan. "The research you are doing in Peru is important to the world. It is this

type of collaboration that makes the world a stronger, safer place for all of us."

NAMRU-6 conducts research on and surveillance of a wide range of infectious diseases that are of military or public health significance in the region, including malaria and dengue fever, yellow fever, viral encephalitides, leishmaniasis, Chagas' disease, and enteric diseases such as shigellosis and typhoid fever.



Vice Adm. Matthew L. Nathan (front center), Capt. David Service (front row, fourth from left), and the NAMRU-6 officers and civilian department heads during Nathan's visit to NAMRU-6.

NMRC Hosts Lecture on NIH Mentorship and Career Mapping

As part of the Naval Medical Research Center's mentorship lecture series, Henry Khachaturian, Ph.D., extramural program policy officer at the National Institutes of Health's (NIH) Office of Extramural Research, was invited to speak at NMRC in January on "Mentorship and Career Mapping: NIH Programs."

NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability. The world's largest source of funding for biomedical research, NIH supports more than 300,000 research personnel at over 3,000 universities and research institutions.

NIH is composed of 27 institutes and centers (IC), each with a specific research agenda often focusing on particular diseases or body systems. Each IC has its own research training and career development program.

Khachaturian advised potential applicants that the process of applying for an NIH grant begins with a great idea. Once applicants have formulated their best and most creative ideas, the next step is to consult with innovative, well-respected mentors and collaborators and put together a well-written, organized, innovative proposal. In addition to learning and understanding the application review process, applicants should make contact with NIH program officers early in the proposal process and study successful grant applications to get a better idea of what makes a successful proposal.

Each new application received at NIH is sent to the Center for Scientific Review. The application is assigned to an IC, which evaluates the application for relevance, and a scientific review group, which evaluates the application for its scientific merit. The application may be returned for revision and resubmission. If the advisory council recommends that a grant be awarded, the application goes to the IC director, funds are allocated, and research begins.

Khachaturian detailed the career paths of researchers with a Ph.D. or M.D. (or equivalent degrees), beginning with graduate or medical school, continuing through postdoctoral fellowships and/or clinical training, and culminating in independent research conducted by



Henry, Khachaturian, Ph.D., extramural program policy officer at NIH's Office of Extramural Research, speaks at NMRC.

experienced principal investigators. He then summarized the grants available through NIH - National Research Service Awards and fellowships available to scientists beginning their research careers; career development awards, which include both mentored and independent research and provide opportunities for basic and clinical investigators; research grants; and loan repayment programs, through which researchers who secure a qualified position funded by a domestic nonprofit organization or U.S. government entity may be eligible for repayment of their student loans.

To learn more about NIH grants and training opportunities, visit <http://grants.nih.gov>. Funding announcements can be found at <http://twitter.com/nihforfunding>.

A Time-honored Naval Tradition with a 21st Century Twist

(Continued from page 4)

the need to save travel resources and were able to plan a traditional change of command ceremony with this modern technological twist. It was a great success and I'm sure that we will be looking at this option for other ceremonies or meetings," said Sanders.

Bono presented Schoeler the Legion of Merit medal for outstanding service as commanding officer from April 2012 to January 2013. Under exceptionally challenging circumstances, Schoeler not only increased the productivity of NAMRU-2, but did so while working as the action officer for a flag-led transition team to coor-

dinate the relocation of NAMRU-2 to Singapore. His drive, knowledge and expertise will be greatly missed.

It was appropriate that Schoeler started and ended his tenure as leader of NAMRU-2 with his favorite line, "It's aloha Friday." Aloha and mahalo.

NAMRU-6 Collaborates on Rabies Study in Peruvian Amazon

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population. The Department of Virology at NAMRU-6 in Lima provided in-country support to this study. In addition, the samples were analyzed at the CDC, the lead organization for this research. Of the 63 individuals tested, 7 (11 percent) possessed rabies virus neutralizing antibodies. All of them reported prior exposure to bats, and only one reported previous rabies vaccination. These results confirm the high risk of rabies virus exposure for those in the Amazon Region and open the pathway for further studies to explore and refine the mechanisms conferring immunity. Although this study was not able to determine

whether genetic differences are responsible for resistance to the rabies virus, the majority of the seropositive individuals were long-term natives of the area, some for many generations.

The research team realized that a lot of misinformation regarding rabies existed among the population despite the fact that many had reported being bitten by a hematophagous bat. According to the data collected, most did not know why these bats attack, what initial measures should be taken (washing wounds with soap and water), or the importance of seeking potentially life-saving medical care (despite the prolonged travel that may entail). Key knowledge deficits

were found in the vast majority of those interviewed. Persons living in this Amazon area often did not understand the real significance of being bitten by a bat and were unlikely to seek medical assistance after a bite. It should be stressed that communication, education and vaccination are still the most efficient weapons to fight this issue.

Dr. Victor Alberto Laguna-Torres, along with Drs. Sergio Recuenco and Jorge Gomez Benavides, two other Peruvian co-authors of the article, have been working together investigating rabies in Peru since the late 1990s, when they were members of the Direccion de Epidemiologia of the Peruvian Ministry of Health.

Greetings from the NMRC Ombudsman!

Happy February! Valentine's Day is this month and I want to talk about hearts...more specifically, I want to talk about your heart and taking care of it. February is Heart Disease Awareness month. In last month's newsletter article, I mentioned making and sticking to your New Year's resolutions. Perhaps one of those resolutions was getting into shape and improving your health. With more than two million heart attacks and strokes a year, this month I want to talk about improving your heart health. Cardiovascular disease is the leading cause of death in the United States. In fact, one in every three deaths is from heart disease or stroke. With this in mind, the CDC, along with other organizations, has launched the Million Hearts initiative. With the aim of empowering individuals to make healthier decisions and improving the care of people who need treatment, the initiative seeks to prevent one million heart attacks over the next five years. To find out more about what you can do to improve your heart health, visit the CDC's helpful website on the topic, <http://www.cdc.gov/features/heartmonth/>. Maybe this is the time to have that annual check up and see how healthy your heart is.

While we are on the topic of health, you can help to lead your whole family to a better, healthier life and the Military OneSource website has some great suggestions on how to get started. Get more info at <https://www.militaryonesourceeap.org/achievesolutions/en/militaryonesource/Content.do?contentId=28080>. (Note: You'll need to create an account and login to use this resource.)

April 15th is just around the corner, and it's time to start thinking about filing taxes. For those of you who live near NMRC, the Volunteer Income Tax Assistance (VITA) program at the Walter Reed National Military Medical Center (WRNMMC) is due to begin service in early February. The VITA is a service that assists service members and their families with preparing and filing their personal taxes, free of charge. Many commands offer access to this program. If you do not live in the vicinity of WRNMMC, inquire about this program at your command.

Finally, Military.com has two articles that I'd like to point to that relate to tax preparation. First, tax time can be stressful. Read the article at the link below about ways to reduce the stress of tax season: <http://www.military.com/money/personal-finance/taxes/eight-tips-to-reduce-tax-time-stress.html?comp=7000023431425&rank=1>.

Also, if you are overseas and wondering how to manage your taxes from afar, take a look at this other Military.com article: <http://www.military.com/money/personal-finance/taxes/military-doing-tax-returns-from-overseas.html>.

As always, if you are in search of other resources or assistance, please don't hesitate to contact me. I can be reached by phone at (301) 233-9789 or by email at NMRC.Ombudsman@gmail.com.

Have a Fine Navy Day!
Alexandra Mora
NMRC Ombudsman