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Commanding Officer
Capt. John W. Sanders

Executive Officer
Capt. Elizabeth Montcalm-Smith

Director for Administration
Lt. Cmdr. Nathaniel Smith

Public Affairs Officer
Doris Ryan

Editors
Jan Helman
Makeda Knott



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Link Between Blast Exposure and PTSD



Members of the Kandahar Provincial Reconstruction Team treat simulated casualties during a base defense drill. The team is made up of U.S. Air Force, Army and Navy service members and civilians deployed to Kandahar province of Afghanistan to assist in the effort to rebuild and stabilize the local government and infrastructure.

SILVER SPRING, Md. - Researchers from the Naval Medical Research Center ([NMRC](#)), the Mount Sinai School of Medicine, and a Veterans Affairs Medical Center published a paper in the October 10, 2012, issue of the *Journal of Neurotrauma* focused on possible warfighter post-traumatic stress disorder (PTSD)-related traits induced by multiple blast exposures.

Researchers from the James J Peters Veterans Affairs Medical Center in the Bronx, N.Y., working with

collaborators from NMRC in Silver Spring, Md., showed, in a laboratory model that repeated blast exposure induced a variety of PTSD-related traits many months after the blast exposure. These traits include anxiety, increased startle responses and heightened fear responses.

The lead author of the paper, Dr. Gregory Elder, a neurologist at the VA hospital, said, "The study is the first to suggest that blast exposure may change the brain's reactions to stress ([Continued on page 11](#))



CNO's Message for the Navy's 237th Birthday

<http://www.navy.mil/viewVideo.asp?id=17600>

NMRC Commanding Officer's Message



There is something to be said for research simply for the sake of knowledge, and maybe one day after I retire from the Navy I'll get a job with a university and pursue some of that sort of research. But here and at our sister labs, we understand we are working with clear research objectives in mind and we have a critically important mission.

The NMRC enterprise is a global activity. Each issue of this newsletter highlights what the labs are doing throughout the U.S. and overseas. The comments from the NHRC CO and the NAMRU-3 CO illustrate some of the incredible work done to meet our mission and the [SG'S priorities](#) of readiness, value and jointness. Each day we strive to keep faith with our fellow sailors and Marines, soldiers and airmen, and citizens of our partner nations by pursuing tangible outcomes that serve to promote their health, protect them from disease or facilitate their recovery after an injury or illness. Reaching those objectives is often, in fact almost always, extremely difficult. But one need only make clinical rounds at the Walter Reed National Military Medical Center to be inspired to do more.

We are going to continue down this path, asking appropriate questions, testing hypotheses, finding solutions and staying focused on our mission. We are going to continue to develop systems and improve processes to make it easier for us to achieve our mission. We have great facilities, and we are enthusiastically supported by our chain of command. We have exceptional people. I am so impressed with the professionalism, expertise and commitment of our scientists and staff. There is no better place to be for world class research and I am enormously proud to be associated with such an incredible group of people. One of the things I have been most impressed with about Navy medical research is our mission focus.

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



NHRC Commanding Officer's Message

The Naval Health Research Center and the Naval Medical Research Center (NMRC) are partnering to introduce an electronic record and management system to track research projects within the network of eight laboratories that make up the NMRC Enterprise. The Enterprise Research Project Manager (eRPM) is designed to assist the laboratories and the higher echelon commands to effectively manage portfolios and facilitate individual project workflow. eRPM enables timely project analysis and a comprehensive view of all programs within the enterprise portfolio. eRPM enables Navy Medicine leadership to monitor budgets, risks and timelines and to better align research activities with mission objectives. In addition, eRPM supports the development of timely information in response to ad hoc requests for information from stakeholders such as members of Congress, Navy/Marine Corps leadership, program sponsors, and public affairs officers.

Efforts are currently underway to institutionalize eRPM by converting it from Microsoft ACCESS to a SQL application hosted on BUMED SharePoint for easier user access, greater data security and creation of a central repository for the system information and product library. Conversion of eRPM to SQL is expected to be complete by the first quarter of fiscal year 2013. Following successful conversion to SQL, launch of the new eRPM on the BUMED SharePoint site, and after a period of user familiarization, eRPM is expected to streamline information management of Navy medical research in our enterprise. Principal investigators will be able to enter work unit or project data once, then update information and milestones in a few minutes per month. Program managers and leadership will be able to directly search for research information, summarize research across the enterprise, check for progress and milestones and obtain simple or complex reports with a few key-strokes in minutes.

NHRC Commanding Officer sends,
Gregory C. Utz
CAPT, MC, USN

NAMRU-2 Pacific's Scientific Research Benefits Cambodia

By Ambassador William (Bill) E. Todd, U.S. Ambassador to the Kingdom of Cambodia

PHNOM PENH, Cambodia – One of the best things about being an Ambassador at an active embassy – like we have in Phnom Penh – is that we are always implementing many projects that benefit Cambodia. Fortunately, I get the opportunity to showcase some of the most exciting projects with you in my blog.

Recently, I had the opportunity to catch up with my colleagues at the U.S. Naval Medical Research Unit No. 2 ([NAMRU-2](#)). The NAMRU-2 staff focuses on conducting medical research that can help keep the Cambodian people safe from diseases.

Just recently they began enrolling new participants in a study that will help identify the reasons for serious respiratory and diarrheal diseases in areas surrounding cities and in rural parts of Cambodia. Once we better understand the cause of such diseases, we can develop better methods of



Project supervisor Malen Luy, NAMRU-2, reviewing how to take GPS coordinates with the staff. Photos courtesy of the Department of State.

If you'd like to learn more about NAMRU-2, check out a description of their work on the U.S. Embassy website [here](#).

Editor's Notes: NAMRU-2's mission is to identify infectious disease threats of military and public health importance and develop and evaluate interventions and products to mitigate those threats. NAMRU-2 supports U.S. interests in the Pacific Theater and advances diplomacy in the region by conducting infectious disease research and improving disease surveillance and outbreak response assistance for infectious diseases of critical public health importance to the United States and our regional partners. NAMRU-2 relocated from Jakarta, Indonesia in June, 2010 and officially opened as NAMRU-2 Pacific June 17, 2010. Current operations are ongoing at the detachment laboratory located in Phnom Penh, Cambodia, and the detachment within the U.S. Embassy Singapore.

NAMRU-2 is a subordinate laboratory of the [Naval Medical Research Center](#), Silver Spring, Md.



A thumbprint to join the study!



Meeting wherever the villagers would like to meet. Here they are meeting in the shade of a tree.

prevention and treatment. Perhaps you know someone who suffers from one of these diseases? If so, you can appreciate what a difference it would make in their life if we could learn how to prevent or cure these diseases better.

The enrollment process for the new study involves going door-to-door in the villages in the study areas. The field volunteers explain to the residents of each house how the study will work and ask the villagers if they are interested in participating. Given that NAMRU-2 hopes to have four villages and a total of 5,000 people participating in the study, the enrollment process takes a lot of person-to-person contact, but it is important that the participants understand the study and are comfortable with taking part in it.

NAMRU-2 sent me photos of the volunteers' first day out in the field. It's great to see our Embassy team working to reduce diseases in Cambodia while helping to strengthen Cambodia's growing public health research field.

Lab in Egypt Actively Involved in Capacity Building in Africa



By NAMRU-3 Public Affairs

CAIRO - The U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) is answering the call of the National Strategy for Countering Biological Threats (2009) for Department of Defense agencies to establish national disease surveillance and detection capacity in resource-poor countries. In August, NAMRU-3 staff members visited Lomé, Togo, to begin collaborations with the Ministry of Health (MoH) in viral disease surveillance, diagnostics and personnel training and move toward establishing a National Influenza Center in the country. Lomé, with a population of over eight hundred thousand, is the capital and largest city of Togo. Located on the Gulf of Guinea, Lomé is the country's administrative and industrial center and chief port.

NAMRU-3 staff members visited Lomé to assess influenza-like illness (ILI) and severe acute respiratory infection (SAIR) surveillance at the
[\(Continued on page 10\)](#)

Centre Hospitalier des Armées de Lomé Assessment Meeting: Representatives from the Institut National d'Hygiène and Togo Armed Forces participated in the Influenza Surveillance Assessment Meeting headed by Dr. Talla Nzussou of NAMRU-3 Ghana Det and Lt. Gabriel Defang of NAMRU-3.

Note from NAMRU-3 Commanding Officer Capt. Buhari Oyoyo



CAIRO - Since the election of the new Egyptian president, the U.S. Naval Medical Research Unit No. 3 ([NAMRU-3](#)) staff continues to execute our research mission with zeal and tenacity--not only in Egypt, but in other countries in Africa, Europe and central Asia. Of course, we do realize that with a newly elected government in Egypt, we meet new challenges with the appointment of fresh leaders. So far, NAMRU-3 leadership has made a point to meet with the new players, such as the new Minister of Health and other important agency heads with whom we partner to accomplish our mission in the region. In addition, we are also forging new relationships with universities, research institutes, and other ministries.

The recent demonstrations and breaching of the walls of the U.S. Embassy remind all staff to be prepared for any eventuality and reaffirm the uncertainty and volatility in the region. We were pleased to learn from the U.S. Ambassador that, despite the recent embassy attack, mission staff would not have a drawdown, unlike what happened at several other missions in this part of the world. The Embassy is now in full operation and is well guarded by the Egyptian police and army. Their presence around the embassy compound gives the staffers assurance that the Egyptian government is onboard with us.

NAMRU-3 also has a police presence, but not of the magnitude now found at the embassy. The NAMRU-3 mission remains to reach out to the warfighters and continues to enhance "soft power" in the AOR. Meanwhile, NAMRU-3 continues to conduct

emergency drills; we have orders written and ready; and NAMRU-3's Continuity of Operations Plan (COOP) has been revised and is ready for implementation when needed. We have reinforced our recall procedures and emergency preparedness plans for our staff and families. I am also working closely with my staff and our command ombudsman to guarantee we are prepared and in touch at all times. In case of ordered evacuation, all active duty staff will report to the Naval Medical Research Center in Silver Spring, Md., where NAMRU-3 will operate until further notice from top leadership. As a commanding officer who has been through many evacuations at the U.S. Naval Medical Research Unit No. 2 in Jakarta, Indonesia and NAMRU-3, Cairo, Egypt, I can assure my staff that NAMRU-3 leadership stands ready to handle evacuations.

Relevance of OCONUS Labs in Evolving Global Health Environment

SILVER SPRING, Md.—Navy Medicine has three labs outside of the continental United States (OCONUS): the U.S. Naval Medical Research Unit No. 3 (NAMRU-3), Cairo; U.S. Naval Medical Research Unit No. 6 (NAMRU-6), Lima; and U.S. Naval Medical Research Unit No. 2 (NAMRU-2) Pacific, Pearl Harbor. In addition to its main lab in Cairo, NAMRU-3 operates a field research site in Accra, Ghana. NAMRU-6, Lima maintains a field laboratory in the Amazon Basin city of Iquitos, Peru, and NAMRU-2 has developed a field research site in Phnom Penh, Cambodia. The location of the three OCONUS labs and their principal field sites on three continents with research projects on five continents and in climatic conditions ranging from tropical rain forests to coastal and inland deserts is ideally suited to the study of the widest range of potential infectious disease threats to operational forces.

The overseas labs were developed during World War II because of the risk that endemic infectious diseases such as plague, malaria and dysentery posed to deployed forces. In response to these infectious threats, NAMRU-2 was established on Guam in 1945 and NAMRU-3 was established in Cairo in 1946. NAMRU-6 was established in 1983. NAMRU-2 relocated multiple times over the years, from Guam to Tapei to Manila to Jakarta and most recently to Pearl Harbor, in response to changing political realities and Department of Defense (DoD) priorities. The focus of the labs consistently remained the study of endemic tropical infectious diseases.

With the emergence of the U.S. as a “superpower” in the post World War II era, the operation of the OCONUS labs (both Navy and Army) was an accepted extension of the U.S. presence throughout the developing world. While the labs engaged their host national medical health and research counterparts in the study of endemic infectious diseases and published the results of these investigations in open literature sources, the major justification for

continuing DoD support of the labs was the development and testing of products (vaccines, diagnostics and drugs) to prevent, diagnose and treat infectious disease threats to U.S. military personnel.

In 1992 the Institute of Medicine published the report, *Emerging Infections: Microbial Threats to Health in the United States*, focusing national and international attention on the threat of emerging infectious disease threats and ultimately leading to the issuance of Presidential Decision Directive NSTC-7 directing multiple U.S. federal agencies to take actions to combat emerging infections. The mission of the DoD was expanded, “To support global surveillance, training, research and response to emerging infectious disease threats.”

With programmatic direction and funding from the newly established DoD Global Emerging Infections Surveillance and Response System (DoD-GEIS) the OCONUS labs were at the forefront of the DoD, national and international efforts to identify and control the spread of emerging disease threats, including drug resistant malaria and enteric infections, viral encephalitis and hemorrhagic fevers, and influenza. In addressing these new threats, the labs had to re-focus programs and personnel to remain relevant in a world where a local disease outbreak could escalate to a global health threat. NAMRU-2, Jakarta, and NAMRU-3, Cairo, played a critical role in identifying the introduction and spread of Highly Pathogenic Avian Influenza (HPAI) in their respective geographic regions of responsibility. While HPAI has yet to emerge in the Western Hemisphere, NAMRU-6 played a pivotal role in working with Peruvian public health agencies to monitor the explosive outbreak of H1N1 Influenza in Peru in 2009.

In recent years, the impact of effective public health programs (particularly infectious disease surveillance, response and control) on national stability has been duly noted by senior DoD leadership, and public



health capacity building initiatives became a priority for both the Geographic Combatant Commanders and various DoD agency programs. In response, the OCONUS labs embraced public health capacity building as an important and relevant extension of their robust emerging infections surveillance and response programs.

The field of global health is now crowded with numerous U.S. agencies, international agencies, non-governmental organizations, and academic global health programs, and most importantly from the OCONUS labs' perspective, with an increasing emphasis, capacity, and expertise within developing nation ministries of health themselves. There has been a dramatic shift from the days when the U.S. was “the superpower” with its DoD OCONUS labs extending its reach to study endemic infectious threats in the developing world to the current situation where the OCONUS labs are more often than not just one of many capable institutions (including other U.S. institutions such as the Centers for Disease Control and Prevention) working to promote public health and research programs in regions where there is now considerable local public health and research expertise.

Despite the vastly expanded field of interest and number of players in global health, the mission focus and operational model of the Navy OCONUS labs have ensured their enduring relevance. As U.S. Navy commands, the labs have clear lines of

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Naval Medical Research Center CO Visits San Antonio Navy Lab

By Joe N. Wiggins, Public Affairs, NAMRU-San Antonio

FT. SAM HOUSTON, Texas – The commanding officer of the Navy's premiere research organization recently visited one of his organization's newest and largest labs, located in San Antonio, and had the opportunity to see the missions and people firsthand.

Capt. John W. Sanders III, who assumed command of the Naval Medical Research Center (NMRC) in Silver Spring, Md. in August, spent a day touring the labs and meeting the staff and researchers of the Naval Medical Research Unit-San Antonio (NAMRU-San Antonio). Sanders also conducted an "All Hands" call, meeting with the NAMRU-San Antonio staff to convey his impressions of the facilities and research. During the event, he also discussed strategic events going on in the Naval research and development community.

Sanders also took the time to meet with all of the staff of NAMRU-San Antonio to voice his impressions and vision about the unit's future.

"You definitely have one of the best biomedical research laboratories in the world here at Fort Sam Houston," said Sanders. "Your vision of what a modern laboratory should be has certainly become a reality. I applaud you for your hard work and dedication you demonstrate here every day."

While meeting and talking with the various departments, the commanding officer of NMRC made his thoughts clear about where Navy biomedical research and development will be headed in the near future.

"Clearly, the Navy is locked in on doing more work in a joint environment in the fields of biomedical research," said Sanders. "Working here now with the Army ISR command at the Battlefield Health and Trauma Research Center, along with the Air Force's 711th Human Systems Wing at the Tri-Service Research Laboratory, you clearly demonstrate your ability as well as your willingness to do whatever it takes to meet today's critical needs of the Navy. Everything you do today to enhance working jointly will pay huge dividends down the road."

The NAMRU-San Antonio commanding officer agreed with Sanders' vision of where we are going and indicated the unit is ready to step up and meet the challenge.

"Wherever possible, I think we can meet Capt. Sanders' challenge to do more to support the warfighter by working to bring even more projects to NAMRU-San Antonio. I know we have the people and facilities to do even greater things for the Navy and all our military partners," said Capt. Rita G. Simmons, commanding officer of NAMRU-San Antonio. "Having Capt. Sanders see all of this firsthand gives him the ability to push our expertise out in the research community, not only in DoD but in the academic world as well. Much of what we do ultimately benefits the civilian medical community as well as the military."

The NMRC commander also commented about how valuable it is to see the men and women at work at



Capt. John W. Sanders III (standing), commanding officer of the Naval Medical Research Center in Silver Spring, Md., conducts an "All Hands" call with the men and women of the Naval Medical Research Unit-San Antonio during his recent visit. During the visit, Sanders toured two facilities, received extensive updates on current research projects and took questions from the unit members. Photo by Joe N. Wiggins.

NAMRU-San Antonio when he returns to performing his duties in the Washington, D.C. area.

"I like knowing more about you and your efforts when representing you to the Navy and the Navy's Bureau of Medicine and Surgery in D.C.," Sanders stated. "Your incredible work is mentioned often in our offices, and knowing more of the depth and detail of what you do better helps me represent you within the Navy, to let people know your value to the warfighter."

While touring the two facilities that make up NAMRU-San Antonio, Capt. Sanders asked many questions about how the researchers and technicians were performing their research, the results of their work and the next phase of many of their projects.

The NAMRU-San Antonio 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. The unit addresses their emergent medical and dental problems in routine and combat operations.

Occupational Exposure Standards for Specialized Navy Applications

By Lisa M. Sweeney, Ph.D., DABT,
CHMM, NAMRU-Dayton

DAYTON, Ohio—Equipment used by the U.S. Navy for deep submergence training (e.g., submersibles and diving suits) must meet specified standards, including those pertaining to the potential internal accumulation of hazardous compounds. These compounds include solvents, paints, plasticizers, and refrigerants as well as compounds created by the human metabolism and decomposition. While atmospheric exposure standards for deep submergence systems have previously been developed, primarily based on 90-day submarine exposure standards, the Naval Sea Systems Command (NAVSEA) requested that the Naval Medical Research Unit-Dayton ([NAMRU-Dayton](#)) develop and document proposed exposure standards specifically applicable to training scenarios for pressurized rescue modules (PRM).



The U.S. Navy's Deep Submergence Unit releases the U.S. Navy Submarine Rescue Diving and Recompression System's Pressurized Rescue Module, Falcon. Photo by Chief Mass Communication Specialist Kathryn Whittenberger.



Chief of Navy Reserve Vice Adm. Dirk Debbink asks Cmdr. Brian Granger, commanding officer of Naval Reserve Deep Submergence Unit Detachment, and Chief Navy Diver Eric Taylor about the capabilities of the atmospheric diving system during a visit to the Deep Submergence Unit at Naval Air Station North Island. Photo by Mass Communication Specialist 2nd Class Ron Kuzlik.

Proposed exposure standards were developed for eighteen chemicals and proposed screening values were developed for two categories of chemicals (total hydrocarbons and total halogens). The proposed exposure standards capture some of the unique aspects of the diving training scenarios. For example, a maximum daily exposure duration of 12 hours (rather than the typical assumption of 8-10 hours) was assumed to accommodate the possibility of two 6-hour training sorties in one day.

Because Navy divers are a fit, healthy group, uncertain "safety" factors for population variability may sometimes be reduced from those applied to a broader population; asthmatics are specifically excluded from serving as Navy divers and submariners, so exposure standards need not be reduced to account for exceptionally sensitive individuals.

In general, the chemical-specific proposed exposure standards are equivalent to or higher than the existing

values. Of the five recommendations to make the standards more stringent, two serve as "screening" values rather than chemical-specific recommendations. In the event that compounds that are identified in the PRM environment are not among those for which exposure standards are available, NAMRU-Dayton has suggested criteria for the evaluation and application of exposure standards from other organizations and has further provided guidance on the consideration of risks from simultaneous exposure to multiple compounds (i.e., mixtures). NAVSEA will have NAMRU-Dayton's proposed standards and guidance externally reviewed in fiscal year 2013.

NAMRU-Dayton conducts research in the areas of acceleration effects, aviation medical standards and personnel selection, physiological and cognitive effects of altitude, vision research, pulmonary health effects, neurotoxicology/neurobehavior, reproductive health and systems biology.

Enhanced Cooperation Between NHRC, CDC, InDRE and Public Health Departments Strengthens Infectious Disease Surveillance

From NHRC Public Affairs

SAN DIEGO – The U.S. Mexico border is the world’s busiest port of entry, with an estimated 350,000,000 crossings per year. While passports are checked at one of the 350 legal entry points between the countries, potential dangerous pathogens get a free ride to new territories. Since 2004, the Naval Health Research Center (NHRC) Operational Infectious Diseases Department has been working with the U.S. Centers for Disease Control and Prevention (CDC), Mexico’s Instituto de Diagnóstico y Referencia Epidemiológicos (InDRE-Mexico’s version of the U.S. CDC) and county public health departments to enhance infectious disease surveillance activities along the border.

Working with national and international partners and funding provided by the U.S. Department of State Biosecurity Engagement Program and the U.S. Armed Forces Health Surveil-



Participants in the annual NHRC Border Infectious Disease Surveillance Training. Front row: Alicia Luna Vázquez, Atenea Estela Andrés Dionicio, Maricela Gordillo Marín, Luis Ángel Sapián López, Sonia Montiel Echeverría, Rita Flores León, Lt. Cmdr. Lori Perry, Lt. Cmdr. Rachel Lee. Back row: Ricardo Morales Jiménez, Pete Kammerer, Capt. Gregory Utz, Capt. Lanny Boswell.



NHRC Commanding Officer Capt. Gregory Utz presents Alicia Luna Vázquez with a certificate of training following completion of training with the Operational Infectious Diseases Department at NHRC.

lance Center, NHRC currently supports ten surveillance sites in Southern California and Arizona. Recently, NHRC hosted an exchange visit with six scientists from InDRE and one from the Border Infectious Disease Surveillance (BIDS) program in San Diego for training in microbiology, enteric surveillance and laboratory safety.

This annual training was started in response to the 2009 influenza pandemic, with the first several years focused on training for the CDC’s influenza polymerase chain reaction test. Training has expanded over the years to other areas NHRC routinely performs in which InDRE has an interest in either starting or expanding, such as viral/bacterial culture/identification, serology and lab quality control/quality assurance. This collaborative research has fostered cooperation, joint training and communication between the participating centers and strengthens preparedness for future public health emergencies.

Naval Academy Professor Contributes to Navy Medicine Research

SILVER SPRING, Md. - Dr. Daniel Isaac, a physician, microbiologist and U.S. Naval Academy professor, is a guest scientist at the Naval Medical Research Center (NMRC) working with Capt. Stephen Savarino, head of the Enteric Diseases Department. At the Naval Academy, Isaac teaches courses in human anatomy and physiology, chemistry, genetics and neuroscience to both plebes and upper class midshipmen. At NMRC, he conducts research on the bacterium enterotoxigenic *E. coli* (ETEC) supporting the NMRC team's efforts to develop an ETEC adhesin-based vaccine for traveler's diarrhea. Traveler's diarrhea is one of the most common non-battle related illnesses troops experience when they deploy and it is endemic in resource-limited countries.

Dr. Isaac looks for ways to attack the bacterium from the angle of how we can better understand the bacterium and how it is able to infect a host in the first place.

"Presumably, if we could learn more about that, we could better develop strategies to ultimately design vaccines to protect people," said Isaac.



Capt. Stephen Savarino, head of the NMRC Enteric Diseases Department (left), and Dr. Daniel Isaac, U.S. Naval Academy professor and NMRC guest scientist.

"It's wonderful how he collaborates with NMRC, bringing a molecular and biochemical approach to the Enteric

Diseases Department's vaccine efforts, as well as providing a potential bridge for educational rotations for midshipmen at NMRC", said Cmdr. David Blazes, director of Military Tropical Medicine at the Navy Medicine Professional Development Center, former medical school classmate and colleague.

Isaac sees the benefit of working at NMRC as being at the forefront of new knowledge, reading about the latest findings, and working on cutting-edge research.

"It's important for people working in academia to be involved in cutting-edge research whenever possible," he said.

It was by chance Isaac learned of the *E. coli* vaccine program at NMRC when he spotted an advertisement seeking a scientist to work on projects related to pathogenic *E. coli*. What immediately struck Isaac as he read the job description was that the Navy places significant emphasis on basic medical research, which he was unaware of at the time.

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Dr. Daniel Isaac, U.S. Naval Academy professor and NMRC guest scientist.

Lab in Egypt Actively Involved in Capacity Building in Africa

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laboratory there. During the visit, Lt. Gabriel Defang, deputy head of the Viral and Zoonotic Disease Research Program, and Mr. Ehab Amir, medical research technologist, assessed the level of training and competency of the surveillance staff in Lomé; reviewed the volunteer enrollment and consent procedures, and the protocol management and storage of samples collected at sentinel sites to be sent to the reference laboratory; and also evaluated the testing and quality assurance procedures at the Lomé laboratory. They further checked on virus isolation capabilities and the capacity for international shipment of biological samples.

“This is one of our efforts to continue capacity building initiatives with countries in Africa, particularly in the area of mil-to-mil relationships. Our continuing efforts will enhance medical diplomacy and soft power in the AOR.”

Capt. Oyfo, NAMRU-3 commanding officer, explained, “This is one of our efforts to continue capacity building initiatives with countries in Africa, particularly in the area of mil-to-mil relationships. Our continuing efforts will enhance medical diplomacy and soft power in the



Centre Hospitalier des Armées de Lomé Assessment Meeting: Representatives from the Institut National d'Hygiene and Togo Armed Forces participated in the Influenza Surveillance Assessment Meeting headed by Dr. Talla Nzussouo and Lt. Gabriel Defang.

AOR [area of responsibility].”

While in Lomé, Amir conducted training on new ribonucleic acid extractor equipment and presented refresher training on the operation and maintenance of polymerase chain reaction equipment and on the proper storage of surveillance samples. Training for five key laboratory personnel was conducted at the Institut National D'Hygiene (INH) Reference Laboratory, with further training for 24 personnel at L'hôpital de Bê, the Centre L'Hospitalier des Armées de Lomé and at INH sentinel sites.

Defang also attended meetings with the Togo military to discuss how to improve the processes of surveillance at military sentinel sites.

“NAMRU-3 can assist with training, diagnostics and additional equipment. One major problem is the high turnover of military physicians trained to conduct ILI and SARI surveillance,” said Defang. He recommended that NAMRU-3 conduct training not only for military physicians but also for physician assistants, nurse practitioners and laboratory technicians to maintain the surveillance activities. He went on to add, “It is also important to convey how important and beneficial surveillance is to the country to motivate all those involved in surveillance. Through GEIS [Global Emerging Infection Surveillance and Response System] funding, NAMRU-3 has increased influenza surveillance capacity in Togo, increasing from no surveillance in 2009 to 252 samples in 2012, with the goal of 1000 samples by 2013.”

A follow-up visit is planned later this year to ensure recommendations are being implemented and to reevaluate the effectiveness of the sentinel surveillance sites and laboratory components in Togo.



Institut National d'Hygiene (INH) Reference Laboratory Expansion Project: Ongoing construction to accommodate virus isolation and advanced molecular testing units.

Research Suggests Link Between Blast Exposure and PTSD

(Continued from page 1)

in ways that increase the likelihood of developing PTSD.”

The paper points out that mild traumatic brain injury (TBI) from blast exposure has been a major cause of injury in Iraq and Afghanistan. A feature of TBI cases has been the prominent association with post-traumatic stress disorder. Because of the overlapping symptoms, distinction between the two has been difficult.

“The research results showed heightened fear reactions were associated with an increase in a specific protein, stathmin 1, known to affect fear

responses in the amygdala, an area of the brain associated with regulating fear responses and thought to be involved in the development of PTSD,” said Dr. Stephen Ahlers, lead on the Navy collaborative team from NMRC’s Department of Neurotrauma. Ahlers presented the results at the Military Health System Research Symposium in Ft. Lauderdale, Fla., August 15, 2012. ([See article on page 12.](#))

The NMRC Neurotrauma Department conducts research on a variety of topics pertinent to the protection, care and resuscitation of combat casualties, primarily those occurring in aus-

tere circumstances with anticipated delay to definitive care. The department maintains three major programs: the Blast Injury Program, the Operational Medicine Program, and the Polytrauma Program.

Article: Blast Exposure Induces Post-Traumatic Stress Disorder-Related Traits in a Rat Model of Mild Traumatic Brain Injury. Gregory A. Elder, Nathan P. Dorr, Rita De Gasperi, Miguel A. Gama Sosa, Michael C. Shaughness, Eric Maudlin-Jeronimo, Aaron A. Hall, Richard M. McCarron, and Stephen T. Ahlers. *Journal of Neurotrauma*.

Relevance of OCONUS Labs in Evolving Global Health Environment

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authority and responsibility. As part of the greater DoD global health enterprise, they have access to robust funding and are partners in large coordinated emerging disease surveillance/biosurveillance, response and capacity building efforts. They attract and retain high-quality U.S. staff and, just as importantly, are supported by highly qualified, loyal and enthusiastic local professional, technical and administrative staff. This local staff also ensures the continuity of critically important partnerships with local national collaborators and support services.

In addition to the HPAI and H1N1

surveillance described above, here are other recent examples of the Navy OCONUS labs’ continuing relevance to global health. NAMRU-2 assisted CDC in the control of an outbreak of dengue in the Marshall Islands (2012). NAMRU-2 detected an outbreak of chikungunya in Cambodia (2012). NAMRU-3 assisted Turkmenistan in establishing a National Influenza Center (2012). NAMRU-3 assisted the Egyptian Ministry of Health and Population in establishing a Molecular Diagnostics Laboratory and a Tuberculosis Diagnostics Laboratory at the Damanhour Center of Excellence in the Nile Delta (2012). NAMRU-6 helped establish a field laboratory of

Instituto de Medicina Tropical “Alexander Von Humboldt” Universidad Peruana Cayetano Heredia in Cusco, Peru. Finally, NAMRU-6 was honored by the Peruvian Ministry of Health for its work and publication on “Arboviral Etiologies of Acute Febrile Illness in Western South America.”

The NMRC and OCONUS lab leadership is confident that so long as the labs continue to adapt to changing local, regional and international health developments while adhering to the mission focus and the operational model that have ensured their success throughout the years, the OCONUS labs will remain a relevant force in the global health arena.

Naval Academy Professor Contributes to Navy Medicine Research

(Continued from page 9)

“He knows a lot about stress pathways in bacteria, which is not the direct focus of studies we do, but they certainly have impact on some of our vaccine development efforts and I knew his involvement could have some collateral benefits for us,” said Savarino.

While the mission of the Naval Academy is to educate midshipmen morally, mentally and physically, Isaac is also working towards the mission of NMRC.

According to Savarino, “The re-

search we do is certainly driven by our mission of developing vaccines and products for sailors and Marines to prevent disease, but it is perched on a foundation of basic studies that allows us to execute applied research effectively.”

Isaac’s goal is to solidify an avenue where his students can be exposed to a career in Navy medicine and basic scientific research. He would like to open up pipelines allowing more midshipmen to pursue research experiences at NMRC.

“This is a great project, and it’s a

project that can probably use a second set of hands. I hope to eventually bring one of my super-talented undergraduates along with me and along with my excellent colleagues, I’ll mentor them in this exciting area of infectious disease research,” said Isaac.

“Isaac’s teaching prowess is well crafted because he keeps abreast of the research world. The benefits to students in his Naval Academy classes and the Navy in general are underscored by his receipt of the prestigious 2012 USNA Apgar Award for Excellence in Teaching,” said Savarino.

Understanding How the Brain Changes After Exposure to Blast

SILVER SPRING, Md. - An extensive body of work has demonstrated that traumatic brain injury (TBI) can increase the potential for post-traumatic stress disorder (PTSD). Even so, mild TBI (mTBI) and PTSD from the current conflicts are often considered to derive from discrete events: mTBI is thought to occur from physical injury to the brain primarily from exposure to improvised explosive devices (IEDs), while PTSD is thought to be a psychological condition resulting from exposure to extreme or intense stress on the battlefield. TBI is a physical trauma that is the purview of neurologists, whereas PTSD is a psychological condition that is the purview of psychiatrists and psychologists.

"In our recently published study, researchers from the DoD and the VA working collaboratively demonstrated that repeated exposure to low-intensity blast events increases the potential for PTSD traits using a rodent model," said

Dr. Stephen Ahlers, Naval Medical Research Center, Department of Neurotrauma. "We showed that the blast exposure changed a region of the brain, the amygdala, a structure that is implicated in the genesis of PTSD. The next step will be to understand the physiological and biochemical events that underlie the observed changes in the brain that result from blast exposure and to assess treatments to prevent, and reverse, these events with the hope that these will prevent the development of long-term sequelae such as PTSD. Understanding the basic mechanisms involved after exposure to blast events will lead to better treatment and preventative measures to protect the warfighter."

Ahlers went on to say that the Operation Iraqi Freedom and Operation Enduring Freedom conflicts have seen a very high incidence of mTBI and PTSD co-morbidity in the warfighter

and veteran populations that ranges in the 60-80 percent range and possibly higher. The high co-morbidity of these conditions suggests potential linkages between the physiological effects from exposure to blast events and the development of anxiety traits from exposure to intense psychological events.

It is extremely important that collaborative efforts such as these address problems that are relevant to both active-duty warfighters and to veteran populations. The consequences of PTSD and mTBI from blast exposure appear to be very long lasting, lasting many months or years. The DoD and VA collaboration permit research on conditions that extend from active duty into the period after the service obligation when servicemen and women become veterans. Research using animal models can provide insight into clinical conditions affecting warfighters and veterans.

Greetings from the NMRC Ombudsman!

October is Domestic Violence Awareness Month! According to the National Coalition Against Domestic Violence, one in every four women will experience domestic violence in her lifetime and almost one-third of female homicide victims are killed by an intimate partner. However, domestic violence doesn't only affect women. Approximately 15 percent of domestic violence victims are male and 30 to 60 percent of domestic violence perpetrators also abuse children. Also, children who witness violence between their parents or caretakers are also at an increased risk of being abusers themselves when they become adults.

If you or someone you know is a victim of domestic violence, HELP is available. Call the National Domestic Violence Hotline at 1-800-799-SAFE (7233). Calls are anonymous and confidential. You are not alone.

For more information about domestic violence, visit the National Coalition Against Domestic Violence website at <http://www.ncadv.org/>. Alternatively, for resources in the National Capital Region, visit <http://www.apa.org/pi/women/programs/violence/domestic-violence.aspx>.

The Navy is also committed to promoting healthy relationships, strengthening families and preventing abusive behavior. Through the Family Advocacy Program, the Navy is trying to raise awareness and provide the necessary resources for victims of domestic violence. For more information on these resources, visit http://cnic.navy.mil/CNIC_HQ_Site/WhatWeDo/FleetandFamilyReadiness/FamilyReadiness/FleetAndFamilySupportProgram/FamilyAdvocacy/index.htm.

On a different note, the weather has turned noticeably cooler and Halloween is just around the corner. Visit the Centers for Disease Control's website, <http://www.cdc.gov/family/halloween/>, for tips on making your child's Halloween fun and SAFE! For ideas that go beyond traditional trick-or-treating, there are plenty of Halloween events planned around the National Capital Region. Below are a couple of websites with a few of these events.

- <http://www.chesapeakefamily.com/fun/fun-and-travel/2629-maryland-fall-festivals-and-halloween-events>
- <http://www.washingtonpost.com/wp-srv/special/artsandliving/halloween/index.html>

In closing, I would like to take a moment to wish the Navy a Happy 237th Birthday! As always, if you are in search of other resources or assistance, please don't hesitate to contact me. My email address is

NMRC.Ombudsman@gmail.com.

Have a Fine Navy Day!
Alexandra Mora
NMRC Ombudsman