

NAVAL MEDICAL RESEARCH AND DEVELOPMENT NEWS

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Secretary of the Navy Visits NAMRU-3

Story by Capt. P.J. Blair, NAMRU-3 Executive Officer



Secretary of the Navy Ray Mabus (center) with the NAMRU-3 Board of Directors. (left to right) Lt. John Oliva, Lt. Cmdr. Gabriel Defang, Lt. Brent Oglesby, Capt. John Gilstad, Secretary Mabus, Capt. Patrick Blair, Sgt. 1st Class Donna Peterson, Mrs. Sherry Nagi and Dr. Mark Wooster. (Photo courtesy of NAMRU-3 Public Affairs)

CAIRO - Mr. Ray Mabus, the 75th United States Secretary of the Navy, visited the U.S. Naval Medical Research Unit No. 3 (NAMRU-3) staff at their campus in Cairo where he was given a tour by the Commanding Officer, Capt. John Gilstad, Nov. 6.

Mabus was in Egypt to meet with U.S. embassy and Egyptian Ministry of Defense officials and jumped at the chance to see the one of the Navy's biomedical research laboratories.

"I am familiar with NAMRU's mission to protect our service members and glad to have the chance to visit this historic laboratory," said Mabus, as he greeted the staff members.

Lt. Cmdr. Gabriel Defang and the virology team briefed the Secretary on NAMRU-3's role in combating infectious threats such as Avian Influenza and MERS-CoV. Afterward they showed the advanced genomics MiSeq

suite, which NAMRU-3 is developing with help from colleagues at the Naval Medical Research Center, Silver Spring, Maryland.

Dr. Mark Wooster, Country Director, U.S. Centers for Disease Control and Prevention (CDC), gave a run down on the integration of the Global Diseases Detection and Response Program with the laboratory at NAMRU-3 before Gilstad commented on NAMRU-3's unique role in advancing global health security in the Middle East, and the detachment in Accra, Ghana.

Lt. Brent Oglesby provided an overview of ongoing building projects or planned at NAMRU-3 and pointed out the renovation of the vivarium and library/auditorium.

Mabus is in his fifth year as Secretary of the Navy. During his tenure he has traveled over one million miles, visiting Sailors and Marines in almost 100 countries while prioritizing "people, platforms, power and partnerships."

NMRC Commanding Officer Message



The New Year is going to bring some interesting challenges, including fiscal, for us to deal with as we continue to support our outstanding research initiatives. What overall impact this will have on the Navy Medicine research and development enterprise is unknown, although I have been told to prepare to do more with less in the upcoming years. We have always been good stewards the tax payers' money and work closely with our sponsors and other DoD, industry and academic partners to maximize return on cooperative research efforts that support our mission. Our researchers provide innovative answers and solutions related to the operational health and medical issues of the men and women in the Navy and Marine Corps working in a variety of operational settings. It is always difficult to look at our past successes and future efforts and know what great work we do, and then have to worry about securing funding to move forward. Several examples, out of so many, illustrate the value of what we do that directly touches so many. Dr. Richard McCarron, Head of the Neuro Trauma Department at NMRC is beginning a study on the long range aeromedical evacuation in hypobaric environments on the physiology and organ function of injured warfighters. Using an established laboratory model, his team will be investigating the idea that hypobaria during simulated long range aero-medical evacuation could have an adverse effect on physiology, lung function, as well as brain tissue oxygenation. Further studies will be needed to simulate other

enroute care scenarios and possibly reevaluate combat casualty care guidelines. The work being done by Cmdr. Jonathan Forsberg, head of NMRC's Regenerative Medicine Dept. and his Army Medicine partner Lt. Col. Benjamin Kyle at the Walter Reed National Military Medicine Center is focusing on improvements in prosthetics options for amputees. They are leading the DoD Osseointegration Program which will begin clinical trials early next year to attach an external prosthesis directly to the skeleton. This unique functional prosthesis will be useful for patients who cannot tolerate a traditional, socket-based prosthesis. And, as our new Surgeon General, Vice Adm. Forrest Faison noted in his final Deputy Surgeon General blog this week, research plays a vital role in theater security cooperation, health threat mitigation and humanitarian assistance and disaster response—initiatives that are underway throughout our Navy Medicine Research & Development enterprise.

It's been a landmark year for Navy Medicine Research and I look forward to the challenges and opportunities we will experience in 2016. Happy Holidays and all the best for 2016!

**NMRC Commanding Officer Sends,
Jacqueline D. Rychnovsky, CAPT, NC, USN**

NAMRU-D Commanding Officer Message

Time flies when you are having fun and becoming the global leader in aeromedical and toxicology research. The fun is only a result of the passion and pride of our researchers and support staff who continue to surge forward despite significant transitions and fiscal challenges. Since the inception of our command in October 2010, NAMRU-Dayton's short history is distinguished and filled with impressive accomplishments and unprecedented milestones. The end of 2015 was a busy time marked by major events. First, NAMRU-Dayton was proud to host the NMR&D Leadership Enterprise meeting in October where leaders were able to meet and brainstorm the future of Navy Medical Research and Development. You can read more about the specifics of this meeting later in this newsletter. The next event was a visit by Navy Medicine West Commander, RDML Gillingham, which proved to be very productive and educational. Shortly after this visit, the 4th Annual Open House and first Technical Day occurred and served as a one stop shop for knowledge and educational outreach with an open exchange of ideas and a prime opportunity for networking and collaboration between the USAF 711th Human Performance Wing and us.

NAMRU-Dayton was then visited by the BUMED Field Support Activity to conduct a spot check on audit readiness compliance and financial areas for improvement. The last but certainly not least events of 2015 included major updates to our inhalation facilities, international visits by our staff to Israel and India with likely collaborative research projects in the near future, and the last phase of acceptance testing of the Disorientation Research Device with a long awaited delivery projected before the new year. In addition to these external events and visits, the daily routine and completion of a myriad of science projects and innovative research continues to be the focus of our efforts.

As I reflect on the past, present, and future of NAMRU-D and our Navy Medicine R&D enterprise, I extend my gratitude for the support of our higher chain of command and my sincere appreciation to the NAMRU-D team for their dedication, loyalty and unsurpassed professionalism. Happy New Year to all!



**NAMRU-Dayton Commanding Officer Sends,
Jeffrey Andrews CAPT, MSC, USN**

Rear Adm. Gillingham Tours NAMRU-San Antonio

Story courtesy of NAMRU-SA Public Affairs



Rear Adm. Bruce Gillingham, Navy Medicine West, learns about NAMRU-SA's investigations to eradicate biofilms and improve treatment of bacterial infections from Dr. Dickson Kirui, biomedical engineer in NAMRU-SA's Maxillofacial Injury and Disease Department. (Photo courtesy of NAMRU-SA Public Affairs)

SAN ANTONIO – “You are contributing significant work here to support our service members on the ragged edge, serving in challenging and austere conditions, to defend our freedoms.”

That was the impression left on Rear Adm. Bruce Gillingham, Navy Medicine West, after receiving a briefing and tour of the Naval Medical Research Unit-San Antonio (NAMRU-SA) and the Tri-Service Research Laboratory (TSRL), located at Fort Sam Houston, Joint Base San Antonio, Texas.

Gillingham came to San Antonio to meet with senior leaders and Navy researchers to understand the strengths and issues of NAMRU-SA, one of eight laboratories the Naval Medical Research Center (NMRC) now under the umbrella of Navy Medicine West (NMW).

“We wanted Rear Adm. Gillingham and his team to see the full range of NAMRU-SA's capabilities to deliver relevant and innovative biomedical solutions to support the survivability of our warfighters,” said NAMRU-SA

Commanding Officer, Capt. Elizabeth Montcalm-Smith. “I am on full receive mode,” said Gillingham, as Montcalm-Smith led him on a tour of the facilities.

Researchers in NAMRU-SA's Craniofacial Health and Restorative Medicine Directorate are investigating a non-antibiotic treatment option that uses lasers and gold nanoparticles to break up bacteria cells.

“If successful, this new treatment could eradicate pathogens, regardless of their level of antibiotic resistance and give health care providers an alternative, non-pharmaceutical approach to treating combat wounds,” said Montcalm-Smith.

NAMRU-SA researchers in the Combat Casualty Care and Operational Medicine Directorate also introduced Gillingham to novel advances in the evaluation of interventions to stem and control hemorrhage, and provide resuscitation for injured warfighters.

After the tour, Gillingham spoke to NAMRU-SA staff at the All Hands call.

“I am impressed by the brainpower, and innovation here at NAMRU-SA,” said Gillingham. “You are conducting research directly relating to what's required and you are well aligned to your operational mission.”

Gillingham acknowledged the strong industry and inter-service collaborations in place that demonstrate jointness; and, the ground-breaking research under way to support warfighter readiness, which he sees in NAMRU-SA and across Navy Medicine West.

“To add significant and relevant value to our work and our mission, we need to perform as a high reliability organization,” said Gillingham.

To achieve value through high reliability, Gillingham identified three important requirements: robust process improvement, leadership commitment, and a culture of safety.

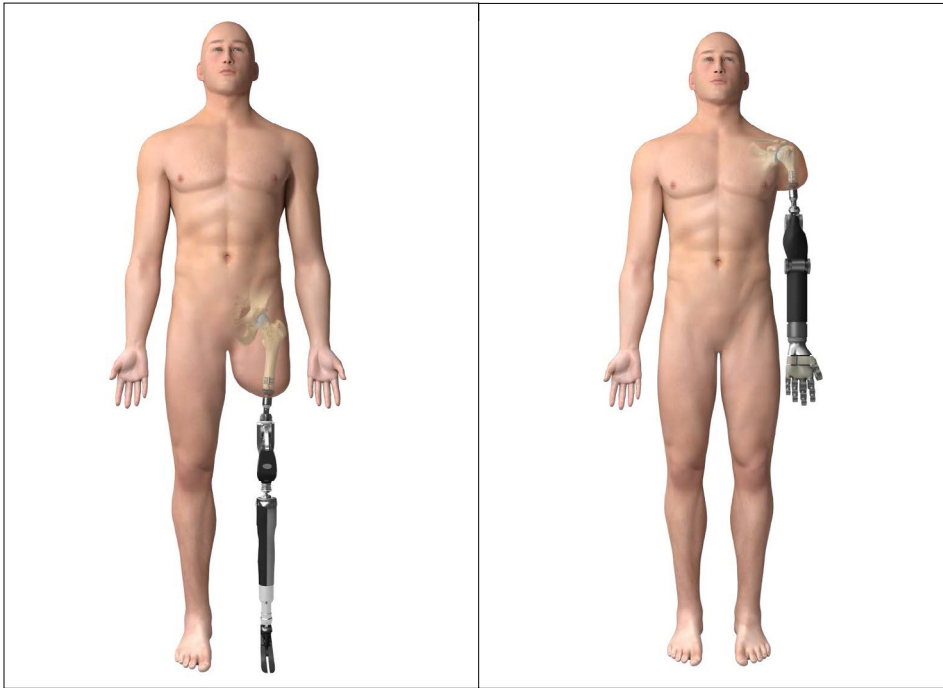
“In our efforts to achieve high reliability, I think the research community can lead the way,” said Gillingham.

Gillingham concluded his talk with questions and discussion from the NAMRU-SA staff regarding various topics from research funding to conference travel. NAMRU-SA staff was pleased to have the opportunity to meet and speak directly with their new senior commander.

“This has been an impressive and truly enjoyable visit. You are integrating the mission and right on track in making significant contributions. I am proud of the work happening at NAMRU-SA and Navy Medicine West takes great pride in supporting you. Thank you for what you do to support our warfighters,” said Gillingham.

Improving Prosthetics for Amputees: NMRC Hosts First DoD Osseointegration Program Meeting

Story by Doris Ryan, Naval Medical Research Center Public Affairs



Two models of the osseointegration prosthesis. OI refers to a surgical procedure to implant a device directly into a bone that will exit the skin and attach to a unique functional prosthesis. (Images courtesy of Naval Medical Research Center)

SILVER SPRING, Md. –The Naval Medical Research Center (NMRC) hosted the first Department of Defense Osseointegration Program steering committee meeting to plan the next step in implementing osseointegration (OI) prosthesis research and clinical trials for wounded service members with upper or lower extremity amputations.

OI refers to a surgical procedure to implant a device directly into a bone that will exit the skin and attach to a unique functional prosthesis. In essence, OI enables one to attach an external prosthesis directly to the skeleton and is useful for patients who cannot tolerate a traditional, socket-based prosthesis.

The steering committee met at the National Intrepid Center of Excellence, located on the campus of Naval Support Activity Bethesda, Maryland, home of the Walter Reed National Military Medical Center.

Army Col. Michael S. Heimall, Interim

Director, Walter Reed National Military Medical Center (WRNMMC), welcomed the attendees.

“This group coming together at this particular time is very important for where we have to go for advanced amputee care and rehab programs,” said Heimall. “You have a unique opportunity with the group you have assembled and with the intellectual capital you have available. We are the world’s leaders, unfortunately, in blast injury and traumatic amputee services because of what we have experienced over the last 14 years.”

OI is a technology that can improve the lives of service members living with major limb amputations. By attaching prosthesis directly to the skeleton, orthopaedic surgeons can mitigate problems associated with skin grafts and heterotopic ossification that are common after blast and other traumatic injury.

Navy Cmdr. Jonathan A. Forsberg, head

of the Regenerative Medicine at NMRC, and Army Lt. Col. Benjamin Kyle Potter, Deputy Chief of Orthopaedic Surgery at WRNMMC facilitated the day-long meeting.

“Osseointegration is uniquely suited for wounded service members with upper and lower amputations, but the technique is complex and requires a coordinated effort,” said Forsberg. “This steering committee will bring together all aspects of the technology to deliver state of the art care to the wounded warfighter. First, we need to establish the priorities to guide complimentary research, establish ways to work together, and make OI a reality for our patients.”

He added, “Because OI is an emerging technology, we have a responsibility to introduce it to DoD beneficiaries in the most conscientious manner possible. By aligning ourselves with existing DoD research and development programs, we have the unique opportunity to develop the complementary technologies that will ultimately make OI safer and therefore more widely applicable in the future.”

Potter provided an overview of the care for wounded warfighters from point of injury in combat to care in a major Military Treatment Facility in the U.S., and the prolonged critical care and rehab needed to overcome their injuries.

“It is important, as we are thinking of this as a DoD OI program, to recognize that military patients really are unique, different from civilian trauma patients,” said Potter. “They have unique sets of problems and a prolonged critical care period. The ultimate goal is maximize return to duty and to maximize function and quality of life for patients who realistically won’t be returning to duty.”

He pointed out that service members who sustain extensive blast related soft tissue trauma to their residual limbs often

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NAMRU-Asia Part of CARAT 2015 Exercise

Story courtesy of NAMRU-Asia Public Affairs

SINGAPORE – The U.S. Naval Medical Research Center-Asia's (NMRC-A) Leading Petty Officer, Hospital Corpsman 1st Class (FMF) Harold D. Sylvester, joined with Commander, Task Force 73 (CTF 73) in teaching tactical combat casualty care techniques to Royal Cambodian navy sailors during the 2015 Cooperation Afloat Readiness and Training (CARAT) exercise held in Cambodia this past November.

CARAT is a series of annual, bilateral maritime exercises between the U.S. Navy, U.S. Marine Corps and the armed forces of nine partner nations in the Asia Pacific region.

CARAT 2015 Cambodia, marks NMRC-A's first participation in the exercise with Sylvester serving as its representative during the medical training component conducted at the Ream Naval Base Medical Center in Cambodia.

Accompanying Sylvester were CTF 73's HMC Oscar Mendoza and Hospital Corpsman 2nd Class Jason Bennet. Royal Cambodian Navy medical officers and enlisted medical providers participated in the training with 15 completing the course. Students learned basic to advanced life-saving techniques and were also introduced to equipment commonly used in U.S. field operations when caring for wounded.

Over the course of five days, Sylvester led instruction on topics such as casualty extraction, splinting and needle decompression along with several hours of practical hands-on training in field-based medical treatment. The training evolution culminated with a



The U.S. Naval Medical Research Center Asia's (NMRC-A) Leading Petty Officer, HM1 (FMF) Harold D. Sylvester, joined with Commander, Task Force 73 (CTF 73) in teaching Tactical Combat Casualty Care Techniques to Royal Cambodian Navy Sailors during the 2015 Cooperation Afloat Readiness and Training (CARAT) exercise held in Cambodia this past November. (Photo courtesy of NMRC-Asia Public Affairs)

casualty simulation where students worked in teams, and were tasked to triage, treat, and evacuate patients in a limited resource setting utilizing a single stretcher. This set the stage for students to decide which of the patients to evacuate first, all while continuing treatment of patients whose evacuations were delayed. The scenario ended with all three patients properly triaged, cared for, and successfully transported.

"They picked up the techniques very quickly," said Sylvester, speaking of his Royal Cambodian counterparts. This was easily one of the most rewarding experiences of my career and the participants

were motivated and eager to learn. Our medical counterparts on the Royal Cambodian team were true professionals and they demonstrated exceptional problem solving skills during the casualty simulation. I have no doubt that these individuals can perform as a cohesive unit at any given time. I'm extremely honored to have been a part of this unique mil-to-mil engagement and I look forward to having future opportunities to interact with our regional partners."

Using MHS Data Repository to Trace Environmental Factors Affecting Respiratory Syncytial Virus

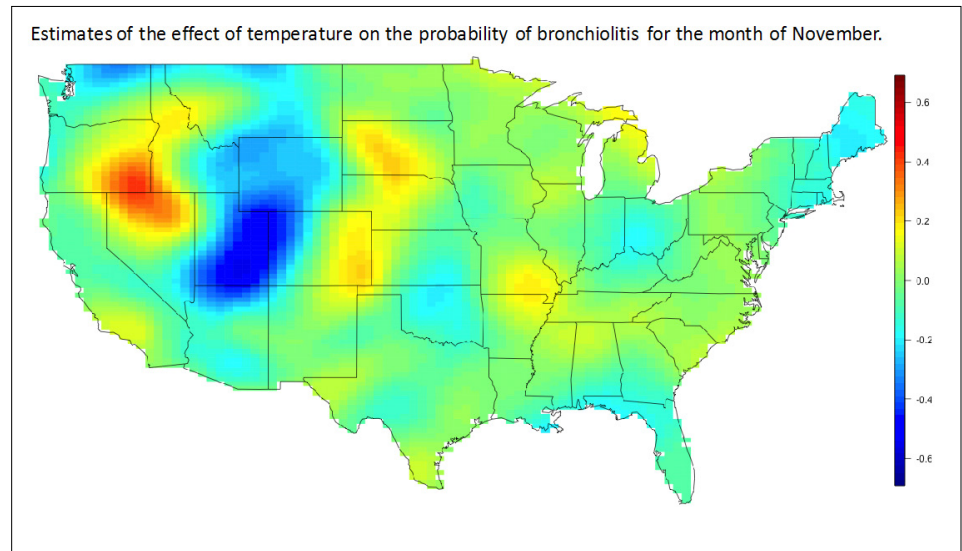
Story courtesy of NAMRU-D Public Affairs

DAYTON, Ohio - Respiratory Syncytial Virus (RSV) causes 50-80 percent of the infant bronchiolitis cases in the United States. It hospitalizes 3.4 million children under the age of five annually worldwide and kills 200,000 children every year, with more than 500 deaths in the U.S. Unfortunately, there is no completely effective treatment for bronchiolitis. In the absence of an effective treatment, understanding the key factors influencing the spread of this deadly virus is paramount.

A team of Navy investigators and scientists from Vanderbilt University and Brigham Young University analyzed the impact of temperature and humidity on the spread of RSV. Obtaining the requisite national view of the illness was imperative when considering large climatic changes. The disjointed patchwork of state and private medical systems made use of civilian databases an impossible challenge. By contrast, the military has a truly national healthcare system with a centralized database capable of such analyses. With almost 10 million beneficiaries of all ages, the Military Healthcare System Data Repository (MDR) is the largest cradle-to-grave national medical database in the country. Its unique national scope presents research capabilities available nowhere else.

Using the MDR, the annual march of bronchiolitis from the Southeastern U.S. to the Pacific Northwest was plotted based on the spatiotemporal characteristics of more than 125,000 cases. The team used data from the National Climatic Data Center and demonstrated that temperature and humidity did influence bronchiolitis rates with the impact being more pronounced at the start and end of epidemics.

Lee, executive officer at the Naval Medical Research Unit Dayton (NAMRU-D) and a pediatric pulmonologist, was part of the team, he said, "While the emergence and termination of viral pathogens in a community are likely impacted by multiple



Respiratory Syncytial Virus (RSV) causes 50-80 percent of the infant bronchiolitis cases in the United States, hospitalizes 3.4 million children under the age of 5 annually worldwide and kills 200,000 children every year, with over 500 deaths in the U.S. (Photo courtesy of NAMRU-Dayton Public Affairs)

factors, studies such as this bring us closer to a fuller understanding of how this disease acts in a population."

Their research results are to be published in the journal [Emerging Infectious Diseases](#).

The study demonstrated the power of the MDR to address medical research questions of a national scope. While the research potential of the MDR has long been recognized, acquiring the required permissions, funding, and expert personnel have prevented any significant research.

In 2008, a public-private partnership between the Navy and the research firm Health Research TX attempted to crack this nut. Together with Capt. Paul Rockswold from the Navy and Marine Corps Public Health Center, Lee served as the government sponsor for this research collaboration, the Health Outcomes Research Center of Excellence (HORCE).

This partnership has brought military physicians and researchers together with

academic and industry partners to answer significant medical questions important to military medicine and the U.S. population.

"To date, HORCE has supported military principal investigators on 46 protocols," said Lee. "In 2014-2015, there were over 50 publications on topics ranging from hemophilia to cardiovascular disease; hip/knee replacement to neurologic diseases. Navy residents and fellows have used HORCE for their graduate studies."

At NAMRU-D, the MDR is being used by Lt. Cmdr. John Bradley, research optometrist, to explore eye disease and Lt. Cmdr. Mike Tapia, aviation physiologist, to investigate spinal disorders in aviators.

"The potential is endless for the MDR and HORCE to answer the important clinical questions which change how we practice medicine. It is extraordinarily exciting to be involved in this initiative."

NMRC's Research Agreement with the VA – Blast Injury Studies

Story by Dr. Margaret Lashof-Sullivan, Naval Medical Research Center

SILVER SPRING, Md. – The Naval Medical Research Center (NMRC) signed an interagency agreement with the Department of Veterans Affairs (VA) to collaborate on three new studies researching the neurological changes that follow blast trauma.

Research teams from NMRC and the James J. Peters VA Medical Center have previously collaborated on the development of a laboratory model of blast-induced mild traumatic brain injury (mTBI).

Several months post-blast exposure, show a variety of post-traumatic stress disorder (PTSD) related traits including increased anxiety, increased response to fear conditioning, and elevated plasma corticosterone.

These findings led to an expansion of collaborative efforts.

The agreement, signed in September, includes research related to the neurobiological effects of blast-induced mTBI and its potential relationship with the development of PTSD. The researchers will work together on three studies.

The first will explore how gene expression, mediated by epigenetic changes such as DNA methylation, is altered in response to mTBI.

The second will study whether mTBI induces changes in the hypothalamic/pituitary/adrenal axis to generate a state of chronic stress that may enhance the likelihood of developing PTSD.

The third tests the ability of an A-Beta-lowering compound to mitigate the cognitive deficits and anxiety.

“This collaborative effort is the type of effort encouraged under the White House initiated National Research Action Plan to coalesce efforts from the DoD, VA and the NIH to address the causes of long-term neurological consequences from blast exposure in our DoD and Veteran populations,” said Dr. Stephen Ahlers Head of NMRC's Operational and Undersea Medicine Directorate, which will have the lead on the studies.

Data from these studies will be analyzed jointly by the VA and NMRC. These research experiments are set to continue through the end of 2019.

Improving Prosthetics for Amputees: NMRC Hosts First DoD Osseointegration Program Meeting

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experience challenges with traditional prosthetic socket fitting and wear.

World experts in OI attended the meeting including Professor Rickard Brånemark, who recently relocated from Göteborg Sweden, to San Francisco. Brånemark developed the OPRA device, has been performing OI procedures in Sweden and other countries for over two decades, and only recently obtained FDA approval for the OPRA device in patients with transfemoral (above-the-knee) amputations.

Seeing an opportunity to expand the indication to patients with upper extremity

amputations, Brånemark, Forsberg and Potter obtained FDA approval to begin an Early Feasibility Study in military patients, this winter.

Attendees also included military and academic experts in the field along with industry product developers and they discussed all aspects of the technology to deliver future care to service members and veterans, including the clinical trials scheduled to begin in early 2016 at WRNMMC.

The clinical trials will include orthopaedic surgeons, rehabilitation physicians, prosthetists and therapists because the post-operative rehabilitation takes between 12

and 15 months.

“There are four clinical trials planned, the first will begin enrolling patients in early 2016 at Walter Reed,” said Forsberg.

He added, “Having these world leaders in OI as stakeholders is critically important, and it has taken several years for us to develop this level of participation. The goal is to advance the science and technology of OI by fostering an environment of discussion and collaboration; and, from that comes innovation. DoD has provided a forum, funding and administrative support to conduct four multi-center clinical trials and several projects evaluating complementary technology.”

Study of Adenovirus-Vaccinated Military Members Shows No Virus Post-Vaccination

Story courtesy of NHRC Public Affairs



Hospitalman Erwin Marte, assigned to Naval Medical Center San Diego (NMCSD), shares a laugh with Mass Communication Specialist 2nd Class Conor Minto during a blood drive hosted by NMCSD on Naval Base Coronado. (U.S. Navy photo by Mass Communication Specialist 3rd Class Gerald Dudley Reynolds/Released)

SAN DIEGO – A study conducted by the Naval Health Research Center (NHRC), published in the *Journal of Clinical Virology* Oct. 29, found that blood samples from military members who received the adenovirus vaccine had no detectable amounts of the virus post-vaccination.

“Recruits are an important source of voluntary blood donations for the military health system,” said Lt. Cmdr. Lori Perry, a preventive medicine physician at NHRC and study author. “The donated blood is used at military hospitals for active duty, retired military, and their family members, some of whom may be immunocompromised. Maintaining recruits’ wellbeing is imperative to ensuring healthy and usable donations, which is why this study was initiated.”

The adenovirus vaccine has been given routinely at recruit training centers starting in October 2011 to help reduce adenovirus infections among the recruits, which can be common in this population. Close living spaces and training-related stress and fatigue are likely factors that contribute to recruits’ susceptibility to these infections.

According to Perry, there is currently no published research showing adenovirus vaccine-generated viremia, a condition in

which the virus enters the bloodstream, potentially infecting other body systems. The concern with the blood donated by recruits was that the adenovirus could be transmitted to the recipient through the donated blood.

“We wanted to know if, and for how long, adenovirus could be found in blood post-vaccination,” said Perry. “We collected and tested blood samples from 249 recruits at Marine Corps Recruit Depot San Diego pre-vaccination and at several time points post-vaccination from the third day up to day 61. No detectable adenovirus was found in any of the blood samples at any time.”

According to the study, the findings indicate that blood donations from a service member vaccinated with adenovirus do not pose any greater risk than any routine blood transfusion to immunocompromised patients.

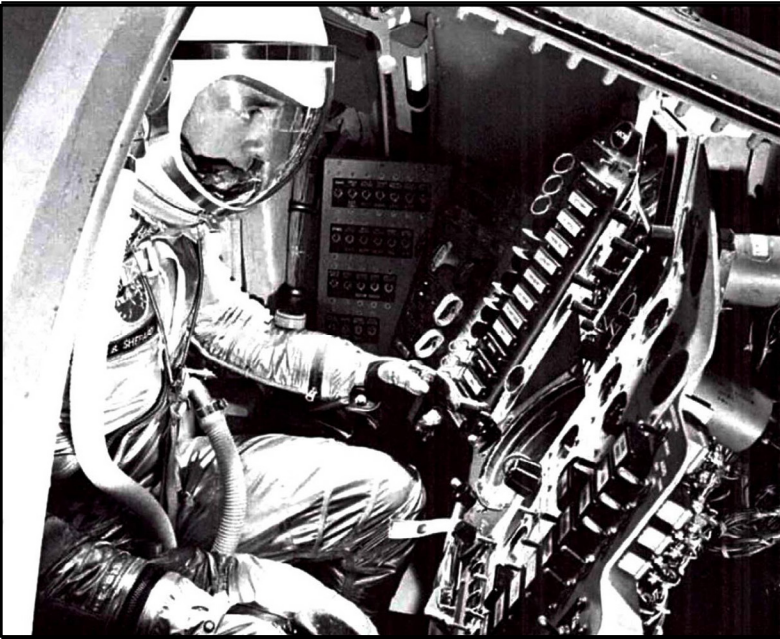
As the DoD’s premier deployment health research center, NHRC’s cutting-edge research and development is used to optimize the operational health and readiness of the nation’s armed forces. In proximity to more than 95,000 active duty service members, world-class universities, and industry partners, NHRC sets the standard in joint ventures, innovation, and translational research.

R&D Chronicles

Navy Medical Research and Project Mercury:

Part IV: Bioastronautics and Medical Recovery

By Andre B. Sobocinski, Historian, Bureau of Medicine and Surgery



"It was a strange and exciting sensation. And yet it was so mild and easy—much like the rides we had experienced in our trainers—that it somehow seemed very familiar. I felt as if I had experienced the whole thing before....Nothing could possibly simulate in every detail the real thing that I was going through at that moment, and I tried very hard to figure out all of the sensations and to pin them down in my mind in words which I could use later. I knew that the people back on the ground—the engineers, doctors and psychiatrists—would be very curious about how I was affected by each sensation and that they would ask me quite a lot of questions when I got back."

~Alan Shepard, *We Seven*

On May 5, 1961, Alan Shepard rocketed into history aboard his *Freedom 7* capsule. The flight was the culmination of three-years of extensive and rigorous preparations for the then uncharted journey into space. The inaugural manned space flight also marked a new phase of the *Mercury* program—medical monitoring and recovery.

Medical monitoring of spaceflights was first proposed by Dr. Stanley White, of the Mercury Space Task Group, in a memorandum dated October 1959. White emphasized the importance of tracking the health and well-being of the astronaut during flight and that the data collected could be used for future post-flight research.

Within each Mercury capsule the astronaut was attached to an assortment of sensors that tracked their heart rates, respiration, body temperature, blood pressure and telemetrically related the data to the ground stations. Navy, Army and Air Force medical personnel serving as aeromedical monitors made clinical assessments based on the incoming data and, if necessary, would determine whether the mission needed to be suddenly terminated.

Just as the astronauts had done previously, the aeromedical monitors underwent an extensive training program. From October through December 1960, monitors became

acquainted with the astronauts, their training program, EKG procedures, environmental systems, the full-pressure suit, biosensors and other monitoring equipment, and received up-to-date briefings on the Mercury Project. During the spaceflights, the monitors were assigned to 16 tracking and monitoring stations located across the globe.

The other vital medical component of Project Mercury was the recovery mission. Capt. Ashton Graybiel, Director of Research, U.S. Navy School of Aviation Medicine, designed a medical recovery mission to ensure that the returning astronauts received needed and timely medical attention. Physicians designated to take part in recovery and post-flight check-up would pay special attention to the effects of high acceleration, weightlessness, rapid deceleration, and disorientation.

Three Air Force and one Navy medical facility (Naval Hospital Yokosuka) were designated to serve as "Project Mercury Recovery Support Hospitals."

The Navy was the designated lead for the recovery operation. Per Graybiel's plan, medical personnel were stationed aboard destroyers, dock landing ships (LSDs), aircraft carriers and at key shore points around the globe.

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Navy Medicine R&D Enterprise Leadership Meet in Dayton

Story courtesy of NAMRU –Dayton Public Affairs



DAYTON, Ohio - The Naval Medical Research Unit Dayton (NAMRU-D) hosted the Navy Medicine Research and Development (R&D) Enterprise Leadership Meeting at Wright-Patterson Air Force Base in Dayton, Ohio, Oct. 21-23, 2015.

Navy Medicine's diverse R&D laboratory leadership from all eight U.S. and overseas laboratories came together to discuss developments and challenges, and to target future planning requirements.

NAMRU-D Commanding Officer, Capt. Jeffrey Andrews said this meeting was "the perfect forum for leaders to exchange ideas and learn how to make our commands unified towards R&D efforts and internal processes that have value making our products and operations better. Common challenges and successes can be discussed and future vision and strategy developed."

During the three-day meeting, focus was on infectious disease threat prioritization, emerging diseases risk management, administrative support items, and the top challenges the laboratory enterprise faces. Working groups and breakout sessions were used to better identify ways to enhance how to do business while meeting the mission requirements.

"The face to face and personal meetings with each other allowed candid and open discussion. This was critical to expediting process improvement and decision making," said Andrews.

The Naval Medical Research Center's (NMRC) Commanding Officer, Capt. Jacqueline Rychnovsky, kicked off the meeting by saying, "Advantages and disadvantages are and should be transparent," which opened the discussion to frame accomplishments and concerns to present to the Navy Medicine West (NMW) Commander, Rear Adm. Bruce Gillingham during the second day of the meeting via teleconference call.

The top five concerns were: 1) support agreements, 2) funding model, 3) fiscal audit impact, 4) human resource transitions, and 5) conference approval timeline. Following the discussion, Gillingham was positive and plans to brief the Navy Surgeon General on Navy Medicine R&D once he has visited all eight NMR&D laboratories.

Gillingham closed with, "Looking forward to being joined at the hip!"

Additionally, Commander of the 711th

Human Performance Wing (711 HPW), Brig. Gen. Timothy Jex, addressed the group. The Commander's brief provided exceptional perspective on how their research is strategically modeled and highlighted the jointness between the Wing and NAMRU-D, both in Dayton and the San Antonio labs.

The attendees were given a tour of NAMRU-D Toxicology and Aeromedical Research Directorate as well as a visit to a few 711 HPW lab areas. This emphasized the unique research capabilities made possible on a joint base such as Wright-Patterson AFB.

When asked what the successes of this year's meeting was Andrews said, "collaboration and networking combined with creative brainstorming resulted in recommendations to the NMRC commanding officer, to further refine the enterprise vision and mission. Speed to decision and coherence was emphasized with collective support from all command leaders. Issues were clearly identified and expectations defined with a way forward that enables teamwork, cross-lab collaboration, total jointness, and robust process improvement."

NMRC Enlisted Sailors Frocked to Next Rank

Story and Photos by Mikelle D. Smith, Naval Medical Research Center Public Affairs

SILVER SPRING, Md. - A frocking ceremony was held at Naval Medical Research Center (NMRC) acknowledging the advancement of two Navy Sailors to the next rank.

Hospital Corpsman 2nd Class Ezechiele Fenelon was frocked to Hospital Corpsman 1st Class and Hospital Corpsman 3rd Class Alison Heads was frocked to Hospital Corpsman 2nd Class.

During the frocking ceremony, NMRC Commanding Officer, Capt. Jacqueline D. Rychnovsky spoke highly of the Sailors and the importance of taking advancement seriously.

"It is always good to see our Sailors advancing to the next rank," said Rychnovsky. "One thing they must keep in mind is they are not only held to a higher standard in their new duties, but they are to fulfill the call of duty for a pay grade higher as well, so we expect them to succeed and flourish."

As is Navy tradition, the Sailors had the opportunity to choose who would tack on their next chevron, finalizing their advancement. Following the frocking ceremony, NMRC personnel congratulated the newly frocked petty officers and a small gathering with refreshments was held to celebrate their achievements.

(Right) Hospital Corpsman 2nd Class (SW) Ezechiele Fenelon (middle) is frocked to Hospital Corpsman 1st Class by Hospital Corpsman 1st Class (FMF) Yusupha Kah (left) and Lt. James Regeimbal (right). (Photo by Mikelle D. Smith, Naval Medical Research Center Public Affairs)



Hospital Corpsman 3rd Class Alison Heads is frocked to 2nd Class by her husband Hospital Corpsman 3rd Class Justin Heads. (Photo by Mikelle D. Smith, Naval Medical Research Center Public Affairs)



Navy Medical Research and Project Mercury: Part IV: Bioastronautics and Medical Recovery

(continued from page 9)

Because of the distribution of these components the returning astronaut was guaranteed medical attention within three hours of landing.

Graybiel's plan was tested by Mercury's inaugural flight in May 1961. After a 15-minute suborbital flight, Shepard's capsule parachuted down just over 300 miles southeast of Cape Canaveral. A Sikorsky helicopter retrieved Shepard and delivered him to the Essex-class aircraft carrier USS *Lake Champlain* (CV-39) where medical personnel and media anxiously awaited.

Navy physician Capt. (later Rear Adm.) Robert Laning who performed the post-mission check-up later recalled, "It was as complete as it could be without X-rays, including a

neurological examination. Of course, we had those facilities available in sick bay. If he had been injured, we would have determined that when he got off the helicopter."

Shepard's launch in 1961 was followed by five more Mercury flights. Due to an atrial fibrillation, astronaut Deke Slayton was the only Mercury astronaut not to take part in spaceflight (Slayton was later cleared to fly during the Apollo Project).

Collectively, the Mercury astronauts logged two days and six hours in space. Without question Project Mercury was a resounding success, even though everything about it—i.e, training, planning and research—could be called experimental. However, without a little ingenuity and imagination as well as some of the "Right Stuff" there would be no Gemini Project, Apollo moon mission or Skylab.

DoD HIV/AIDS Prevention Program Hosts Training for Global Staff

Story courtesy of NHRC Public Affairs



Dr. Rick Shaffer, director for the DoD HIV/AIDS Prevention Program (DHAPP) speaks to program managers and field staff during a week-long training session designed to provide them with an update on operational and program requirements as well as up-to-date knowledge on effective HIV treatment, care, and prevention programs. (Photo courtesy of NHRC Public Affairs)

SAN DIEGO – The DoD HIV/AIDS Prevention Program (DHAPP), which is headquartered at the Naval Health Research Center (NHRC), hosted training in San Diego Nov. 16-20, for program managers and field staff from 42 different partner countries.

DHAPP, an implementing agency for the President's Emergency Plan for AIDS Relief (PEPFAR), assists foreign military partners to develop and implement military specific HIV/AIDS prevention, care, and treatment programs. The training provided program managers and field staff with a comprehensive update on PEPFAR strategy, programmatic review, and training on financial, operational, and monitoring and evaluation requirements.

"It's extremely important that our program managers have the most up-to-date knowledge on how to implement effective HIV treatment, care, and prevention programs," said Dr. Braden Hale, program manager for DHAPP. "Our program managers are an essential component of the DHAPP strategy to lessen the impact of HIV on foreign militaries."

Dr. Jack W. Smith, director for health

services policy and oversight with Defense Health Affairs, addressed the program managers to discuss the importance of global health engagement.

"Global health engagement is one of Dr. Jonathan Woodson's, assistant secretary of defense for health affairs, six pillars in terms of priorities for the Military Health System," said Smith. "Global health outreach helps to improve the stability of the countries we are assisting, it improves the capabilities and self-sustainment of those countries, and that, by its very nature, helps to improve the stability of the world, which makes it less likely that the United States may have to intervene on a military basis. I am very appreciative of the work that our program managers do each and every day in support of this."

One of the goals of the training was to provide an opportunity for program managers and field staff to review military, clinical and treatment cascade data and programming strategies to reach epidemic control within militaries around the world.

"Over the past 18 months, we've seen a more targeted strategy and shift toward focusing on treatment by the global HIV/

AIDS community, led by the United Nations Programme on HIV/AIDS, the World Health Organization, and PEPFAR," said Claire Wolf, special assistant for DHAPP. "It's important for our technical, epidemiological, programmatic, and operational staff to collaborate as we review and align our country strategies."

In attendance were 52 DHAPP program managers and field staff that included professionals with backgrounds in public health, infectious disease, finance, and program management. They came to San Diego from 42 different countries including Mozambique, Djibouti, Ukraine, Democratic Republic of the Congo, and Sierra Leone.

"A majority of our program managers are an 'army of one' in their country," said Wolf. "They are locally employed staff who work at the U.S. embassy in their country to provide the day-to-day operational oversight and program management of the military HIV program. They are vital members of the DHAPP team, working to ensure militaries around the world have policies for a healthy and deployable force, programs to prevent new infections, and capable health systems in place to provide care and treatment for troops and their dependents."

DHAPP partners with the Department of State, the U.S. Agency for International Development (USAID), the U.S. Department of Health and Human Services (HHS), and the Peace Corps in providing guidance and assistance to 61 partner military HIV programs around the globe.

As the DoD's premier deployment health research center, NHRC's cutting-edge research and development is used to optimize the operational health and readiness of the nation's armed forces. In proximity to more than 95,000 active duty service members, world-class universities, and industry partners, NHRC sets the standard in joint ventures, innovation, and translational research.

NAMRU-6 Track's Disease for US And Peruvian Militaries

Story courtesy of NAMRU-6 Public Affairs



LIMA, Peru - The U.S. Naval Medical Research Unit No. 6 (NAMRU-6) Biomedical Informatics Department (BID) provides technical assistance to military health authorities in U.S. Southern Command Area of Responsibility on the use of eHealth solutions to manage force health protection.

The main portfolio includes the development and implementation of software solutions for syndromic surveillance, HIV-AIDS prevention and care, and program monitoring and evaluation in military populations.

BID's most successful projects has been the development, deployment and implementation of the Peruvian Military Electronic Disease Surveillance System (PMEDSS) in the Peruvian armed forces. PMEDSS is the only means for military health authorities to notify diseases of mandatory reporting throughout the country.

The system uses Interactive Voice Response and internet technologies for infectious disease data capture at central and remote locations. Since its deployment in 2001, and after its second release in 2011, PMEDSS has successfully provided real-time information for public health decision-makers in Peruvian military

populations. In addition, BID provides training on electronic disease surveillance and outbreak control and response to Peruvian military health personnel from central and remote locations. The training is an important opportunity for partner militaries to strengthen their ability to monitor health event and trends and detect disease outbreaks.

In February 2015, BID in partnership with Department of Defense HIV-AIDS Prevention Program (DHAPP) successfully delivered a software solution to the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). The Site Improvement through Monitoring System (SIMS) captures and analyzes site-level program data in partner countries.

The development of SIMS 2.0, to be released in January 2016, is a joint effort of BID with other U.S. Government agencies that execute PEPFAR activities. In addition, BID developed additional eHealth software solutions in support of DHAPP's health systems strengthening activities for other military partners in Central America and Caribbean to monitor HIV/AIDS prevention and health care data.

The deployment, implementation, and adoption of these solutions are

coordinated with DHAPP, SOUTHCOM, U.S. Military Assistance Advisory Groups, and local military points-of-contact.

Mrs. Mary Kratz, Senior Information Technology Advisor, DHAPP says "The Bioinformatics Department at NAMRU-6 exemplifies competent collaboration. No matter how complex the informatics challenge, Dr. Hora and his team have the ability to manage a project smoothly, professionally and efficiently. In addition to biomedical domain knowledge, the team has expertise in all aspects of informatics. It is a pleasure to work with them on U.S. Defense HIV/AIDS Prevention Program eHealth activities that support our partner militaries globally."

NAMRU-6's work with national and international agencies is conducted by a multidisciplinary team of subject-matter experts in medical and public health informatics, using open-source technologies and extensive software development quality assurance tests and developing comprehensive implementation and adoption plans.

BID is ready to collaborate in biomedical informatics research and development projects, and provide superior eHealth solutions and products to address public health issues of military relevance.

NAMRU-3 Collaborates with Nigerian Researchers

Story courtesy of NAMRU-3 Public Affairs



Reham Tageldin (center) provided training on *Anopheles* mosquito larvae collection. (Photo courtesy of NAMRU-3 Public Affairs)

CAIRO – With a mission to study and detect disease threats of military and public health importance, the U.S. Naval Medical Research Unit No. 3 (NAMRU-3) engaged with Calabar Institute of Tropical Diseases Research and Prevention (CITDR&P) via funding from the Armed Forces Health Surveillance Center to advance an ongoing collaborative project to conduct surveillance for the vectors of malaria in a previously unsurveyed area in Cross River State, Nigeria, Sept. 14-19.

In line with this project's goal to expand vector surveillance, NAMRU-3 trained thirteen civilians from

CITDR&P and five military personnel from the Nigerian Army Preventive Medicine Department at Eburutu Military Barrack on malaria vector trapping, identification and insecticide susceptibility, and identified new trapping sites for malaria vector surveillance.

"Establishing trained personnel is the key to the success of this project. This training will allow for ongoing malaria disease risk assessments, which is critical to pre- and post-deployment evaluation for health risk exposure," explained Dr. Hala Bassaly, NAMRU-3 principal investigator for this project.

Professor Emmanuel Ezedinachi, Director of CITDR&P, expressed his keenness to sustain the project, saying, "This training will be important to continuously achieve the project goals for CITDR&P and NAMRU-3."

The continued partnership with CITDR&P expands NAMRU-3's collaboration with the Nigerian Army Preventive Medicine partners in Calabar. "I'm enthusiastic for the collaborative journey that NAMRU-3 and CITDR&P teams are undertaking," said Brig. Gen. Sani Mohamed.

NAMRU-3 investigators also met with Mr. Robbie Nelson, Country Director, Department of Defense (DoD) Walter Reed Program-Nigeria, to build on the U.S. DoD research partnership in West Africa.

Lt. Joseph DiClaro, deputy officer in charge NAMRU-3 Ghana detachment said, "The DoD casts a very large surveillance network when we work together. Our hope is to link with our Walter Reed colleagues to assist in building a sustainable surveillance program with our Nigerian military partners."

By establishing trained field surveillance teams, identifying new sites for vector surveillance, and building new partnerships, this project ensures accurate and professional monitoring of vectors in Cross River State enhancing force health protection and public health in this new region.

Collaborative efforts between NAMRU-3, CITDR&P and the Nigerian Army Preventive Medicine Department will be vital for the future of this project which continues to updates to changes in the vector population.

NHRC Sleep Lab Hosts Insomnia Workshop

Story courtesy of NHRC Public Affairs

SAN DIEGO –The Naval Health Research Center (NHRC) hosted its first insomnia workshop to bring researchers and clinicians together to discuss collaborative opportunities for addressing insomnia and sleep-related problems in service members, Nov. 20.

“The main objective for hosting this event was to discuss how we can improve the way we prevent, diagnose, and treat insomnia in our Sailors and Marines,” said Dr. Rachel Markwald, sleep research physiologist and director of NHRC’s sleep lab, who organized the workshop. “Perhaps, the most important aspect was getting local area military providers together and engaged about sleep issues and how they impact operational readiness.”

Attendees included primary care physicians, clinical psychologists, social workers, and sleep specialists from the San Diego region including Naval Medical Center San Diego (NMCS), the Concussion Care Clinic at Naval Hospital Camp Pendleton, and OASIS, a residential treatment program in San Diego for active duty patients with combat-related post-traumatic stress disorder (PTSD).

“Obtaining healthy sleep is foundational to having a healthy brain,” said Cmdr. Paul Sargent, director of the Concussion Care Clinic. “We must use sleep to not only foster high performance, but also resilience in the face of adversity. The cognitive demands on warfighters have never been higher. Well-rested fighters will have increased vigilance, faster reaction times, and better problem-solving skills. Collaborative efforts will not only prevent disability and improve recovery times it will also lay the foundation for more effective

human performance programs in the future and positively impact our ability to accomplish the challenging missions which we are assigned.”

A special guest was Dr. Anne Germain, associate professor of psychiatry, psychology, and clinical and translational science at the University Of Pittsburgh School Of Medicine. Germain discussed her research on the mechanisms underlying sleep disturbances, especially within the context of PTSD and traumatic brain injury, and her work developing and adapting evidence-based behavioral treatments.

During the day-long workshop, participants discussed current approaches for treating insomnia and fatigue, specific barriers to treatment, evidence-based pharmacological and non-pharmacological treatment options, and better ways to provide care and treatment for patients with insomnia and sleep-related problems from initial complaint through diagnosis and treatment.

“As far as I know, this is the first time we’ve had people from all these different areas come together to discuss sleep problems and the way forward for helping our patients,” said Capt. Tony Han, a Navy physician and director of NMCS’s Sleep Lab. “Our goal was to put our minds together and look at how we can collaborate to improve treatment for insomnia. This capability affects all of our Sailors and Marines, because sleep is critical for mental resilience, physical performance, and our ability to bounce back from injuries.”

According to Markwald, the workshop was instrumental in helping her and her team better understand how NHRC’s sleep lab can support

the different clinics and health care providers. Limited resources have prevented the traditional implementation of these treatments at most clinics; however, adapting these approaches to account for the challenges and uniqueness of each military treatment facility is possible and needed. The NHRC sleep team is currently collaborating with NMCS’s Sleep Lab to perform research that addresses these needs.

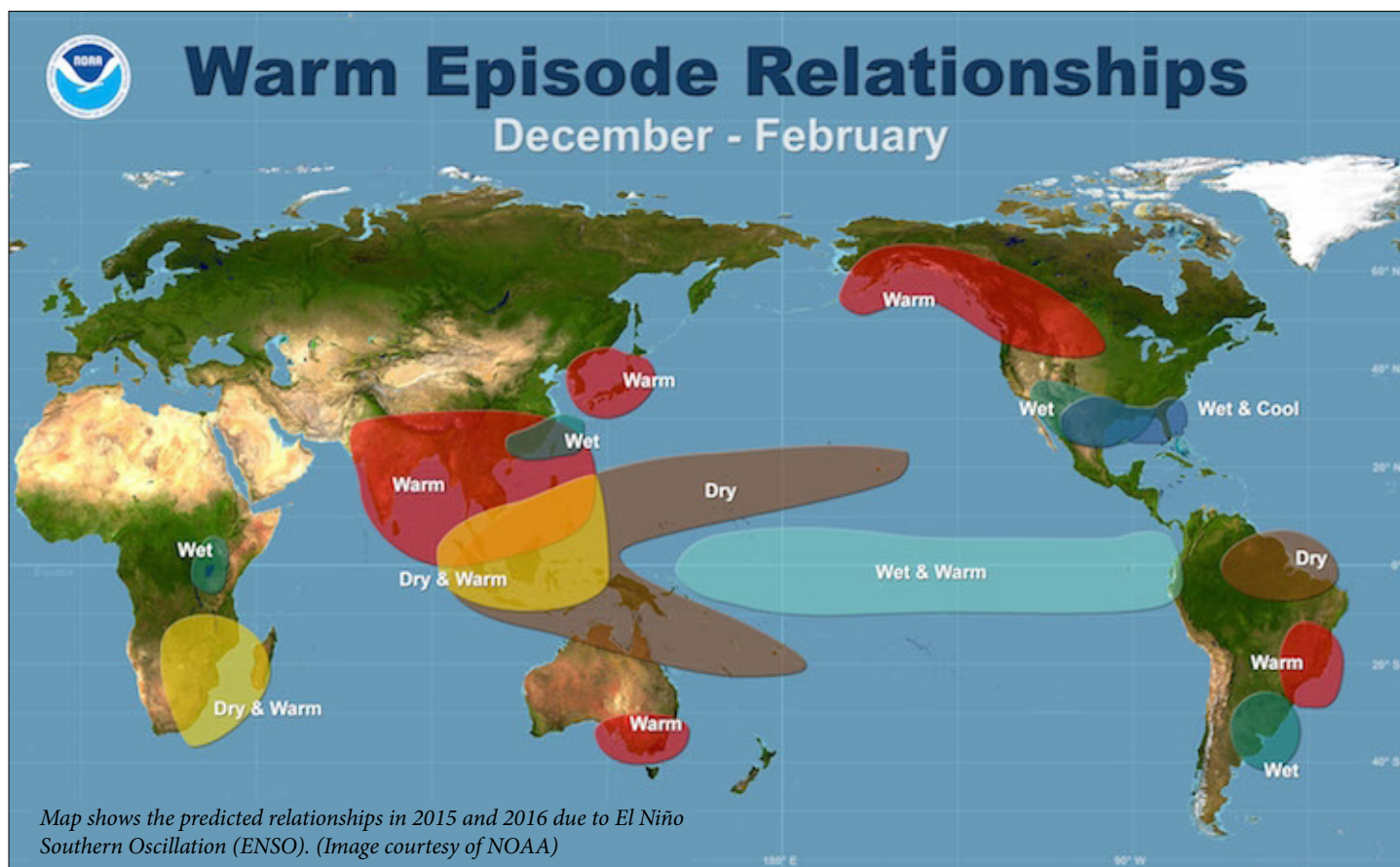
“The current practices for treating insomnia are not sufficient,” said Markwald. “There needs to be a push to increase patient access to evidence-based, non-pharmacological treatment options. Medications used to promote sleep can have side effects, interactions with other prescriptions, dependency issues, and doesn’t treat the underlying cause in most cases.”

“Moving forward, we want to consider future collaborations and research projects about how we can provide better avenues for educating our Sailors and Marines about proper sleep, sleep hygiene, and the problems associated with sleep loss,” said Han. “We want to improve awareness of the importance of sleep in everyday life as well as in the military.”

As the DoD’s premier deployment health research center, NHRC’s cutting-edge research and development is used to optimize the operational health and readiness of the nation’s armed forces. In proximity to more than 95,000 active duty service members, world-class universities, and industry partners, NHRC sets the standard in joint ventures, innovation, and translational research.

NAMRU-6 Aligns to Support Disaster Response to *El Niño* in Peru

Story courtesy of NAMRU-6 Public Affairs



LIMA, Peru - The world is in the beginning phases of what is projected to be the biggest *El Niño* event since 1997. *El Niño* Southern Oscillation (ENSO) is a climatological phenomenon characterized by an increase in the sea surface temperatures of the Pacific Ocean that normally occurs every 3-7 years and affects over 160 million people. Peru is especially impacted by the ENSO due to the reversal of the Humboldt Current directly off the northern Peruvian coast.

The U.S. Naval Medical Research Unit No. 6 (NAMRU-6) is preparing to assist as part of a new model for 21st century global health engagement. As an integral component of the U.S. Mission to Peru, NAMRU-6 is collaborating with the U.S. Embassy and the Peruvian Armed Forces including the Peruvian

Navy (NAMRU-6's host organization). NAMRU-6 will assist the U.S. Embassy with its preparations to include: (1) supporting the development of early warning systems for extreme weather events, climate change-sensitive diseases, food security, and migration; (2) characterizing climate change mitigation including air quality improvements, burden of disease, healthcare cost savings, and enhanced economic productivity; and (3) building alliances with academic institution, research institutions, and impacted populations to engage them in data analysis, communications, monitoring, disease surveillance, and adaptation actions.

The human impact of ENSO lags behind the elevated sea surface temperatures by several months, allowing a period of preparation. During the 1997-98

mega-ENSO event, the Peruvian north coast suffered floods and destruction challenging access to healthcare; displacement led to human migration, rapid unplanned urbanization, and overcrowding. Malaria jumped to over 120,000 confirmed cases, in part as a result of pooling water which created new ecosystems for anopheles vector reproduction.

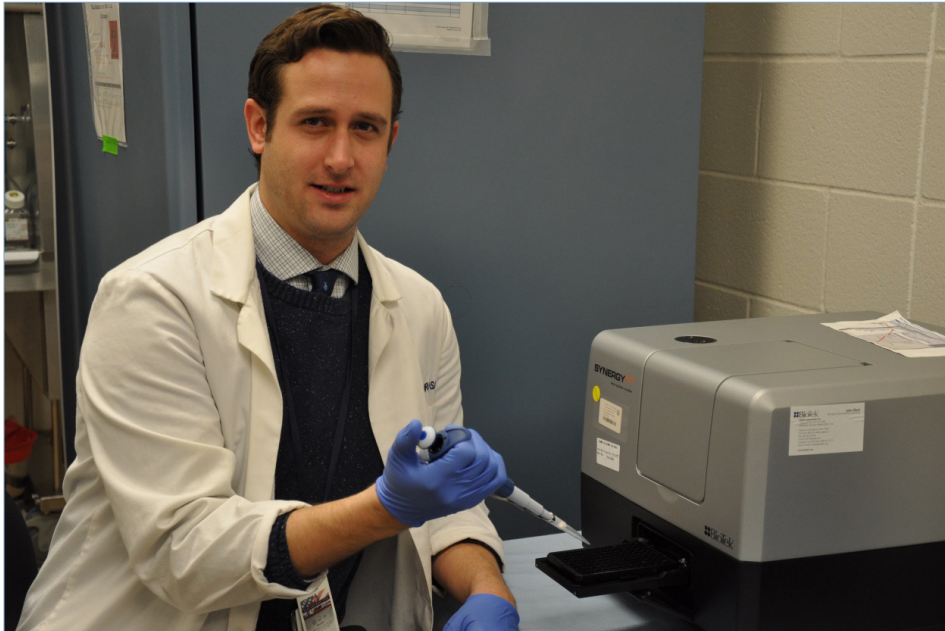
Heavy rains were also associated with an increased incidence of other infectious diseases like 55 cases of Bubonic plague caused by *Yersinia pestis*, a dengue increase of 21,000 cases from 1998 to 2001, and an increase of the transmission of Chagas disease.

Floods spread sewage waste into drinking water sources and there

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NAMRU-SA Investigates Immuno-Typing to Personalize Combat Casualty Care

Story by Philip J. Vernon, Ph.D., NAMRU-SA



Dr. Philip Vernon, researcher in NAMRU-SA's Immunodiagnostic and Bioassay Development Department utilizes a small (15 pound) and portable microplate reader to perform a primary immuno-typing test for white blood cell activity conventionally performed with a large (350 pound) hospital flow cytometer. Utilizing this repurposed and easily portable microplate reader brings immuno-typing one step closer to becoming practical in a combat environment. (Photo courtesy of NAMRU-SA Public Affairs)

SAN ANTONIO - Breakthroughs in high-throughput gene analytics and rapid testing are helping scientists and clinicians predict outcomes to therapeutic regimens in patients based on their specific phenotype in a variety of diseases. As the civilian medical community moves towards highly-individualized clinical care, research at the Naval Medical Research Unit - San Antonio (NAMRU-SA), is taking this approach one step further to address the critical needs in combat casualty care.

The incredibly evolved human immune system may be the ultimate tool in personalized care, and each of us possesses a sophisticated immune repertoire of tools to fight infections and promote wound-healing. We also know that the immune system of a warfighter in the combat theater is severely dysregulated in the event of trauma and hemorrhage.

Damaging immune responses are primary

mediators of life and death in instances of injury, and clinical outcomes are largely determined by the magnitude of inflammation present, which is known to vary incredibly amongst individuals. That's why determining a service member's immune system's capacity to respond to injury (immuno-typing) before an injury happens has the potential to be a profoundly invaluable tool for clinical decision-making.

We are utilizing sophisticated models of trauma and hemorrhage to determine our ability to predict outcomes using baseline immuno-typing. Simple tests already clinically-available are being evaluated for their utility in predicting both injury outcomes and responses to therapy.

Using samples no greater than a few hundred microliters of blood obtained during routine and non-invasive in-processing procedures, we can immuno-type an individual based on their white

blood cells' ability to respond to a naturally occurring stimulus in the laboratory.

The results, which vary from one individual to another, will allow us to stratify patients according to immuno-type. Those identified as "high responders" demonstrate an increased risk for inflammation and damaging pathology in response to trauma, and would need aggressive therapy. "Low-responders" may be able to avoid unneeded aggressive intervention which itself may be injurious. This translates into the appropriate triage and personalized application of therapy to treat wounded warriors.

Importantly, we also understand the necessity of transitioning expensive and complex fixed-facility capabilities into operationally-deployable settings. That is why in addition to using commercially-available hospital diagnostics to immuno-type individuals, we are also repurposing equipment to make these tests logistically possible in emergency medicine settings closer to combat theater.

For example, one of our primary immuno-typing tests is an assay for white blood cell activity conventionally performed with a hospital flow cytometer. The typically large (350 pound) flow cytometers are well suited for a fixed hospital setting, but in the combat theater it is bulky, expensive and immobile. We have successfully optimized a new procedure delivering the exact same measurements using a much smaller (15 pound) and less-expensive microplate reader. Utilizing the repurposed and easily portable microplate reader brings immuno-typing one significant step closer to becoming practical in a combat environment.

The exploration of immuno-typing is just another way NAMRU-SA remains at the cutting-edge of Navy Medicine research and fulfills our mission to improve the medical care of Navy and Marine Corps personnel in operational and combat environments.

US NAMRU-3 Contributing to Fight against MERS-CoV in Middle East

Story courtesy of NAMRU-3 Public Affairs

CAIRO - It has been over three years since the first report of a human infection with a novel Middle East respiratory syndrome coronavirus (MERS-CoV or MERS). Since then, the virus has infected 1618 people and killed 579. The Arabian Peninsula, home of the U.S. 5th Fleet, has borne the brunt of this debilitating respiratory disease, with the Kingdom of Saudi Arabia at the epicenter.

Twenty-six countries across three continents including the U.S. have seen imported cases. Reports have documented non-sustained and limited person-to-person spread. The threat of MERS to U.S. Forces was accentuated by the recent outbreak in South Korea, when a Korean Airman on the U.S. Osan Air Force base tested positive for the virus.

With supportive treatment the only recourse for affected patients, the need for effective countermeasures is of utmost importance. Towards this end, the U.S. Naval Medical Research Unit No.3

(NAMRU-3) in Cairo, Egypt, and the Naval Medical Research Center (NMRC) in Silver Spring, Maryland, partnered with the National Institute of Health-Integrated Research Facility, Sanford Applied Biosciences, and other academic groups to develop a candidate anti-MERS human polyclonal immunoglobulin therapy using genetically engineered bovine.

To date, a candidate whole virus vaccine has been tested in laboratory models. This vaccine utilizes a MERS-CoV strain which was first isolated at the NAMRU-3 laboratory from a patient infected in Jordan.

In Nov 2015, under the sponsorship of the International Vaccine Initiative and King Abdul Aziz City of Science and Technology, scientists and clinicians pursuing MERS-CoV countermeasures were invited to Riyadh, Saudi Arabia, to discuss a road map for ushering in phase I/II MERS clinical trials in the region.

The Navy Medicine research and development enterprise was represented by Lt. Cmdr. Gabriel Defang, Department Head, Viral and Zoonotic Diseases Research Program at NAMRU-3 and Dr. Tom Luke, preventive medicine physician and principal investigator of MERS-CoV efforts at NMRC.

As phase I/II safety and efficacy trials begin in the Middle East for candidate MERS countermeasures, Navy Medicine and their U.S. Army counterparts stand to play a significant role. NAMRU-3 is well positioned to support upcoming regional clinical trials on MERS countermeasures in collaboration with governmental public health entities, pharmaceuticals, and other U.S. government agencies.

"An effective MERS countermeasure is within reach, and the Department of Defense will play a significant role in its realization", reckons Lieutenant Commander Defang.

NAMRU-6 Aligns to Support Disaster Response to *El Niño* in Peru

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were increases in diarrhea incidence and foodborne infections. Trade and transportation in the jungle halted as roads flooded and rivers became too full and debris-laden to permit safe passage. In the capital city, diarrheal disease, one of the leading causes of death in young children worldwide, spiked to 200 percent.

Higher ambient temperatures have also triggered cholera outbreaks by promoting environmental aquatic reservoirs for *Vibrio cholera*. This has the potential for massive human impact, with the last mega-epidemic causing 260,000 cholera cases in the department

of Lima alone.

Globally, ENSO events are associated with extreme weather events leading to floods, drought, landslides, and large-scale human displacement. Ecological disturbances lead to changes in insect vector populations that transmit diseases such as malaria, dengue, and chikungunya, in addition to affecting fish migration and decimating crop yields and animal production. The frequency and magnitude of ENSO events has been increasing and is expected to continue to intensify as temperatures rise.

NAMRU-6's mission is to research, understand, and develop protective strategies against infectious diseases

affecting uniformed service members and the general population in Peru and throughout Central and South America while enhancing public health capacity through respectful cooperation with collaborators.

Hosted by the Peruvian Navy and co-located at their flagship hospital in Lima, at the Naval Hospital in Iquitos, and in Puerto Maldonado; NAMRU-6 conducts research on and surveillance of a wide range of infectious diseases of military or public health significance in the region, including malaria and dengue fever, yellow fever, viral encephalitis, leishmaniasis, and enteric diseases such as shigellosis and typhoid fever.

NMRC Sailors Participate in Wreath Laying Volunteer Event at Arlington National Cemetery

Photos by Yeoman 2nd Class (SW) Andre Gore, Naval Medical Research Center

ARLINGTON, Va. - Naval Medical Research Center (NMRC) Sailors Lt. Jose Garcia, Lt. Melissa Mehalick, Lt. James Regeimbal Yeoman Second Class Andre Gore and Hospitalman Apprentice Erickson Chacaltana participated in Wreaths Across America, Dec 12.

More than 50,000 volunteers attended the yearly event to lay holiday wreaths on the graves of veterans buried in the Arlington National Cemetery. The event gives recognition and honor to the men and women who served in the United States Armed Forces and gained national recognition in 2005.



Today, I placed a Wreath on the Grave
of an American Hero...

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