

Bug Bytes Volume 8 Issue 3 October 2014

Welcome

Navy Environmental and Preventive Medicine Unit-TWO serves the public health needs of the Navy. Our subject matter experts assist Navy and Marine Corps forces with public health reach-back support, training and consultation. We support both deployed and non-deployed forces. We support both shipboard and shore commands such as medical treatment facilities. Our staff is composed of Audiologists, Biochemists, Entomologists, Environmental Health Officers, Health Promotion Specialists, Industrial Hygienists, Microbiologists, Occupational and Preventive Medicine Doctors, General Duty Corpsmen, Radiation Health Technician, and Preventive Medicine Technicians. We also employ, train, and deploy a Forward Deployable Preventive Medicine Unit capable of meeting a variety of force health protection needs from small humanitarian assist missions to full scale operations.

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Hello from the OIC

CDR Jennifer Espiritu, Officer in Charge

NEPMU-2 staff members have had a busy summer – coming and going from deployments and TAD assignments to almost every Combatant Command’s AOR across the globe, responding to novel threats like Chikungunya and Ebola virus disease, and officially making room in our organization for our colleagues from the CIHL. I was pleasantly surprised to read about the depth and breadth of our expertise as illustrated in this edition. I hope you enjoy it too.

Continue to reach out to us with your questions about public health and preventive medicine - we'll answer the call, anytime and anywhere

Very Respectfully Yours,
J.M. Espiritu
CDR MC USN (FS)



NAVY ENVIRONMENTAL AND PREVENTIVE MEDICINE UNIT TWO
PROTECTION THROUGH PREVENTION

NEPMU-2 Entomology Technical Assist Visit: CSL Comalapa, El Salvador

By LT James Dunford, PhD, Entomologist

Cooperative Security Location Comalapa provides deployed U.S. aviation units the operational and maintenance support to conduct around the clock operations. Under the operational control of U.S. Naval Forces Southern Command (NAVSO)/U.S. 4th Fleet, this remote forward operating location was opened in August 2009 by the U.S. Navy and Air force to increase the effectiveness of multi-national counter illicit missions and NAVSO directed humanitarian missions. Operational tempo at CSL Comalapa has been escalating since the closing of CSL Manta, Ecuador, increasing personnel stationed and moving through this location. Chikungunya, a mosquito-borne disease first reported in the Caribbean in December 2013, has spread into Central America with over 5,000 cases reported throughout much of El Salvador. Cases of dengue, another virus transmitted by the bite of infected *Aedes* mosquitoes, has also been increasing. In order to prevent mosquito bites and potential exposure to these diseases, a technical assist visit was requested by CSL Comalapa Commanding Officer CDR Odin Klug to treat uniforms with permethrin and to establish a mosquito surveillance program.

Traps for both day-biting and dusk/night-biting mosquitoes were positioned throughout the base to locate areas where mosquitoes were present; mosquitoes collected in these traps were counted and identified. Larval surveillance was also conducted on-site to locate breeding sources. Interviews with both U.S. forces and Segunda Brigada, El Salvador's Air Force were made to determine when and where mosquitoes were biting and if febrile illnesses had been reported in personnel. The overarching goals of the surveillance program are to identify and eliminate potential breeding sources, begin to track relative mosquito abundance over time, and identify species present. NEPMU-2 is also building the capacity to test mosquitoes for diseases and *Aedes* mosquitoes collected at CSL will be sent to NEPMU-2 for testing. With this information the CSL Medical Department, who will be in charge of the surveillance program, will be able to better coordinate with contracted vector control by making recommendations for targeted and timely control efforts.

Species known to transmit Chikungunya and dengue were scarce during our visit; however continued trapping is necessary as mosquito populations fluctuate over time. The vectors of other mosquito-borne disease were

present, and emphasis on personal protective measures was made to CSL Medical. Source reduction, or eliminating mosquito breeding sites, was identified in areas on base away from the American compound. These areas contained discarded tarps as well as tires that held standing water and numerous mosquito larvae. Discarding the trash or dumping out the water provided mosquito control without much effort. Mosquito populations and conditions conducive to larval breeding were low where U.S. forces operate; however, areas of concern were located at nearby construction sites and El Salvadorian troop billeting/structures.

Mosquito surveillance equipment and supplies, Individual Dynamic Absorption (IDA) uniform treatment kits, and 34.4% DEET were provided to the CSL Medical Department along with guidance on how to implement an integrated mosquito control program. There are currently no vaccines for either disease, so personal protection countermeasures and timely mosquito control operations are critical to reduce exposure to mosquito bites. Continued work with Segunda Brigada medical personnel and the El Salvador Ministry of Health will also be crucial to best protect U.S. and host nation forces from mosquito-borne diseases.

The NEPMU-2 Entomology Division plans to establish additional surveillance sites at Naval installations where the vectors of chikungunya and dengue are present.



From left to right: Mr. Clifford Schmidt (NEPMU-2 Industrial Hygienist), LT James Dunford (NEPMU-2 Entomologist), CDR Odin Klug (CSL CO), HMC Rodney Lanning, and HM1 Isidro Avalos.



HMC Rodney Lanning (NEPMU-2 PMT) and HM1 Isidro Avalos (CSL Medical Department) practicing CDC light trap assembly near U.S. compound.

The CIHL

By Amy DeLong, PhD, Chemist

Working in occupational settings with the potential for exposure to harmful and toxic substances is part of a usual day for many active duty sailors and Navy civilians. In 1989, the Comprehensive Industrial Hygiene Laboratory (CIHL) program was established to monitor Navy personnel exposure to chemicals through air, bulk, and swipe sampling. The results generated by the CIHL are provided to industrial hygienists and health care professionals, who then make assessments regarding personal protective equipment or whether a worker should be enrolled in medical surveillance programs.

Presently, the Navy operates two CIHLs; East in Norfolk, VA based at EPMU2 and West in San Diego, CA based at EPMU5. The laboratories are accredited by American Industrial Hygiene Association (AIHA)-Laboratory Accreditation Program (LAP), LLC for industrial hygiene analysis and environmental lead. The laboratory is also accredited by COLA for participation in the DoD Clinical Laboratory Improvement Program (CLIP).

Each laboratory is staffed with chemists and technicians that have diverse analytical expertise and many years of experience serving in government, private industry, and academia. The two labs manage all of the Navy's industrial hygiene samples as well as offer pediatric and occupational blood lead testing.

Exposure to organic solvents and vapors may occur through a variety of job settings, particularly those more industrial in scope. Many of CIHL's solvent and vapor requests are received from Naval shipyards or fueling operations. However, the laboratory has received samples from administrative offices to military gun ranges to analyze for exposure to components in cleaning and degreasing solvents. Most of the samples in the organic section are analyzed by gas chromatography (GC). GC offers the capability of detecting and quantifying many chemicals from one sample, which generates useful profiles for worker exposure.

Many metals have been linked to the development of cancer and other chronic diseases, especially after long-term occupational exposure. The CIHL metals section provides a routine scan of 14 metals including arsenic, beryllium, cadmium, nickel, and lead. Metals analysis in bulk samples is offered as well. Air, bulk, and swipe samples are analyzed by inductively coupled plasma-atomic emission spectroscopy (ICP-AES).

Like GC, ICP-AES permits quantification of multiple metals from a single sample. The metals section also receives blood samples from Hampton Roads area Navy clinics for determination of lead levels in pediatric and adult patients. The results of lead analysis may provide an opportunity for intervention prior to permanent health effects.

Prized for tensile strength and insulating properties, asbestos was readily utilized in building construction until the late 1970s. Occupational asbestos exposure has been directly implicated in the development of diseases such as lung cancer and mesothelioma. CIHL analysts quantify asbestos content and inform customers of the type of asbestos identified. Such information is important, as asbestos remains a prominent concern today while potential contact for personnel in the handling and removal of possible asbestos fibers occurs during the remodeling or demolition of Navy facilities and vessels.

Chromium (VI) testing from welding, plating, and blasting operations accounts for much of the sample volume in the Liquid Chromatography/Ion Chromatography (LC/IC) section. Chronic exposure to chromium, also one of the primary components in paint pigments, is associated with an increased risk for lung and respiratory cancers. The LC/IC section also provides analysis of many chemicals found in paint and cleaning operations, such as isocyanates and formaldehyde.

For further information on the sampling guide and services the CIHL offers, please visit <http://www.med.navy.mil/sites/nmcphc/comprehensive-industrial-hygiene-labs/Pages/default.aspx> or contact Mrs. Helen Penn, CIHL Laboratory Director, at 757-953-6562.



The CIHL's atomic absorption machine testing for mercury.

NEPMU-2's participation at Southern Partnership Station 2014

By LT Paula Volk, Environmental Health Officer

Navy Environmental and Preventive Medicine Unit TWO's very own Preventive Medicine Technician (PMT) Petty Officer 2nd Class Alonso Garcia was aboard the joint high-speed vessel USNS Spearhead (JHSV-1) as part of the Southern Partnership Station 2014 from May-October.

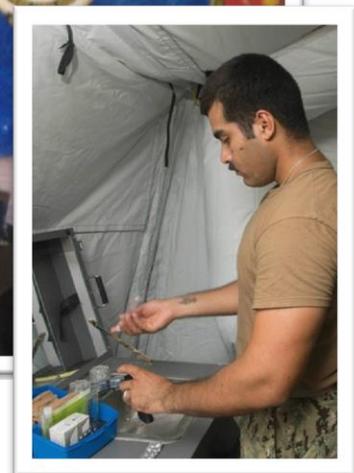
The Southern Partnership Station 2014 mission was to share knowledge and expertise when visiting the participating countries, to improve capabilities in key areas. Areas focused on were: medical readiness, operational risk management, port security, non-commissioned officer professional development, motor maintenance, and patrol craft operations, among others. These exchanges enhanced regional security through expertise interactions, refined coordination and development of lines for communication. The types of operations and engagements were requested by, and coordinated with each partner nation. The countries involved were Belize, Colombia, Guatemala and Honduras.

Southern Partnership Station is a U.S. Southern Command (SOUTHCOM) directed operation planned by U.S. Naval Forces Southern Command (USNAVSO) and U.S. Fourth Fleet was carried out by the USNS Spearhead. The concept is based on the premise that strong partnerships enhance regional stability and security. The training teams are comprised of about 100 service members from all military services. The USNS Spearhead carried a command element, military training teams from Navy Expeditionary Combat

Command, the U.S. Marine Corps, and U.S. Army, and civilian personnel representing Military Sealift Command.

USNAVSO requested a PMT from NEPMU-2 to provide expertise in preventive medicine and force health protection while aboard the USNS Spearhead. Hospital Corpsmen 2nd Class (HM2) Garcia was selected to fill this role. He was involved in assessing, preventing and controlling health threats in the countries visited for the ship personnel and providing any assistance to the host nations. HM2 Garcia identified and evaluated endemic and anthropogenic environmental health hazards and assessed the risk of adverse health outcomes. He provided advisement to the operational commander for significant health threats and recommended interventions for the ship personnel. He also worked with the host nations for a range of public health concerns such as: disease vectors, infectious and communicable diseases, and occupational and environmental health threats, sanitation controls, food borne illness risks, and water quality and treatment.

"It was a great experience for an exchange of knowledge with the local preventive medicine assets, with how we both implement preventive measures, seeing the similarities and differences," said HM2 Garcia. "It was valuable learning the different methods each country used while using fewer materials, and achieving the same result. What a great opportunity to represent the U.S. military and keep our bonds strong."



As a PMT with Southern Partnership Station 2014 HM2 Alonso Garcia filled various roles from vector controls, community outreach, to water testing.

FDPMU Team 1: Operational Readiness Exercise at Fort Story, VA

By Hugh Cox, NMCPHC

The Forward Deployable Preventive Medicine Unit (FDPMU) Team 1's Operational Readiness Exercise (ORE) took place September 15-19 at Fort Story, VA. FDPMU Team 1 is manned from NEPMU-2 and was evaluated by the Navy and Marine Corps Public Health Center (NMCPHC).

This year's ORE was considerably different from years past. It was held on the East Coast instead of at Camp Pendleton, CA in an effort to help manage costs, by conducting it in the same region as the training team. The exercise offered participants an opportunity to test their skills individually and as a team in areas such as pest control; air, soil and water quality assessment, health risk communication, disease outbreak investigation and response, and chemical and biological warfare agent's detection. In addition, exercise scenarios were recently reduced from 24 to 12 and revised based upon the Navy Mission Essential Tasks List (NMETL). More importantly, the scenarios were more complex and involved different FDPMU components. This ORE involved scenarios simulating a joint exercise between the U.S. and Taiwanese armed forces operating in Taiwan. During the exercise, a simulated earthquake hit Taiwan, and the FDPMU provided support following the establishment of a tent city for internally displaced populations (IDP).

The changes were designed to enhance the capability and effectiveness of Navy public health professionals in operational settings, and include the development of more complex and relevant scenario-based exercises that typically occur during the annual FDPMU ORE over a six day period, and based on either wartime support or humanitarian and civic assistance, or a combination of both.

Exercise participants had to manage various "threats" to the operational forces as well as the civilian population. Scenarios included a suspected scrub typhus outbreak investigation in the U.S. military barracks, a suspected unknown samples analysis for biological and chemical warfare agents, occupational and environmental health site assessment in a Taiwanese port, IDP camp insects and rodent complaints investigation.

According to Hospital Corpsman Derek Galvao, NEPMU-2 Preventive Medicine Technician (PMT) and exercise participant, the ORE touched on many key points. "Every person on the team is vital in completing the mission, even the most junior," said Galvao.

"I feel confident that we would be ready to face any mission-related task."

FDPMU's are being called upon to support increasingly diverse missions that include providing front-line force health protection to U.S. and coalition forces, and scenario-based OREs help ensure that these preventive medicine teams are ready to respond.

"As a member of two deployed FDPMU teams - Haiti, Kuwait - and having been through multiple OREs over the years, I valued the opportunity to pass on those operational experiences and real-world lessons learned to the current team," said Hospital Corpsman 1st Class Ryan Predum, NEPMU-2 Laboratory Technician. "The NEPMU-2 ready-team has been training together for months and the ORE gave all involved a chance to work and live in a simulated operational environment and tackle some very realistic scenarios."

"The team had great leadership in our team OIC, component-leads and subject matter experts collaborated well on scenarios, and communication was free flowing throughout the team," added Predum.

NEPMU-2's team successfully completed this ORE and is certified as surge-ready for world-wide deployability.

For more information on FDPMU capabilities, visit the NMCPHC website at:

<http://www.med.navy.mil/sites/nmcphc/expeditionary-platforms/fdpmus/Pages/default.aspx>



Front row, left to right: HMC Jennifer Nolen, LCDR Andrew Bobb, LT Paula Volk, HM1 Noel Torres, LCDR Syed Husain, HM2 Hasson Herbert, HM1 Robin Lenon. Back Row, left to right: HN Derek Galvao, ENS Kevin McManus, HN Wesley Taylor, LCDR Patrick McKenna, LT James Dunford, HM2 John Linton, HM1 Ryan Predum

Evaluation of Novel Insecticides and Repellents at Centers for Disease Control and Prevention, Atlanta

By LT James Dunford, PhD, Entomologist

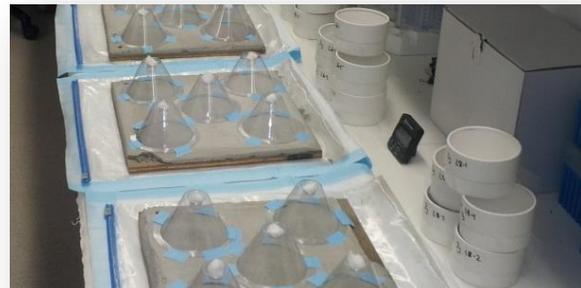
Insects can rapidly develop physiological and genetic mechanisms to induce insecticide resistance; thus, there is an on-going need to discover new insecticides and repellents. A number of naturally occurring compounds that demonstrate insecticidal activity are currently being evaluated by researchers in hopes of discovering new products to manage disease-transmitting and nuisance arthropods. There is also a need to improve the residual effectiveness of existing insecticide formulations. Environmental degradation of insecticides renders them ineffective, forcing vector control specialists to make frequent insecticide applications, often at great expense and time. Frequent insecticide applications also accelerate the development of resistance. I am currently the primary investigator on two multiagency studies, one to evaluate a long-lasting insecticide and the other a novel insecticide/repellent consisting of carbon-chain fatty acids. The studies include collaboration with the Centers for Disease Control and Prevention (CDC), Navy Entomology Center of Excellence, Camp Blanding Joint Training Center (Florida National Guard), and private industries. College interns enrolled in CDC's work study program have also assisted with these projects. NEPMU-2 OIC CDR Jennifer Espiritu, M.D. encourages these collaborative efforts, and challenges staff to identify areas in their respective fields to showcase the capabilities of Navy Medicine.

One of the primary interventions to reduce the transmission of malaria in Africa and other malaria-endemic regions is indoor residual spraying (IRS), a process that involves treating walls with an insecticide to kill mosquitoes when they rest. Before being used during IRS campaigns, these candidate insecticides are evaluated for their efficacy and residual longevity. The World Health Organization (WHO) ultimately approves their use for malaria eradication campaigns such as the President's Malaria and Amazon Malaria Initiatives. We are currently evaluating the residual efficacy of a new insecticide formulation by treating 12"X12" panels made of cement, wood, sheet metal, mud/dung mixture (common building surfaces used in Sub-Saharan Africa) retrofitted in experimental huts located at Camp Blanding Joint Training Center, FL. Treated panels are left to 'weather' (climatological conditions at the field site are similar

to those encountered in Africa) in experimental huts to evaluate insecticide residual properties. A subset of treated panels is shipped to CDC at pre-determined intervals (one week, one month, two months, etc.) to evaluate residual efficacy using WHO cone bioassays. During each assay, malaria-transmitting mosquito species in colony at CDC are subjected to treated surfaces and mortality is tracked at set time intervals. So far, insecticide-treated surfaces show significant mosquito mortality through three months of testing.

We are also evaluating a compound currently known as C8910 for its insecticidal and repellency attributes. There is a growing interest in using environmentally-friendly compounds for arthropod control, and C8910 shows great promise as both an insecticide and repellent. Because this compound does not appear to be related to other existing insecticide classes, it may prove to be a valuable new tool to reduce exposure to biting arthropods and an answer to insecticide resistance. We recently published our first paper http://www.academicjournals.org/article/article1412238189_Dunford%20et%20al.pdf and additional testing is currently being conducted in CDC laboratories. These new long-lasting insecticides and novel compounds may ultimately be evaluated for national stock number consideration, making them readily available to Department of Defense vector control specialists. Continued development of new insecticides and repellents will provide the deployed war-fighter and military personnel on humanitarian missions additional protection from disease-transmitting arthropods.

For more information on these and other projects in the NEPMU-2 Entomology Division, please contact LT Dunford: james.dunford@med.navy.mil



Insecticide-treated panels in CDC insectary

Flu Season

By LT Paula Volk, Environmental Health Officer

Influenza (flu) is a contagious respiratory illness caused by influenza types A or B viruses. The flu is easily spread by airborne respiratory droplets from person to person (often by sneezing or coughing) but can also be transmitted by touching something contaminated with the virus and then touching their mouth, nose, or eyes. Symptoms of infection include fever, muscle aches, headache, malaise, nonproductive cough, sore throat, and runny nose. Most people who get the flu will have mild illness and recover in less than two weeks. Some people, however, are more likely to get flu complications that result in being hospitalized and possibly death. Pneumonia, bronchitis, sinus infections, and ear infections are examples of flu-related complications.

For all DoD uniformed personnel the flu vaccination is mandatory and any refusal to receive the vaccination will constitute a failure to obey a lawful order and may be punishable under the Uniform Code of Military Justice unless medically or administratively exempt. For Navy Civilian healthcare workers providing direct patient care in DoD medical treatment facilities it is also mandatory. For other Navy civilian personnel it depends upon condition of their employment as it is written in their contract.

Whether it is mandatory or recommended for you to get the flu vaccine, here are a few misconceptions regarding the vaccination and influenza.

- **Misconception #1: The flu vaccination causes the flu.** No, it takes about two weeks after you have been vaccinated for you to be protected. Therefore, if you have been exposed before or any time within that two week window after you have received the vaccination, you could develop the flu. Furthermore, you could have some side effects, but these are usually mild and go

away on their own. Again, the vaccine does not cause the flu.

- **Misconception #2: I got the vaccination last year, I don't need to get it again this year.** Every year the formulation for the vaccination could and usually changes. It is based on research of the probability for the most likely strains of flu that will circulate i.e. the vaccination formulations are a best guess prediction for each flu season. In 2008 the formula for the flu missed identifying the correct strain that circulated and nearly half of flu cases were from the strain of the virus not covered in the vaccination. That is why every year it is extremely important to get your seasonal flu vaccination.
- **Misconception #3: I got the flu even though I was vaccinated against it.** When the vaccine is well matched to the predicted virus strains, they are 70-90% effective in preventing the flu. However you could still develop the flu, and the vaccination will lessen your symptoms and potential for serious complications.

The navy will have both injectable "shot" and intranasal "flumist" available for this season. The injectable is an "inactivated" or "recombinant" vaccine, which means these do not contain any live influenza virus. The intranasal is sprayed in the nose and is an "attenuated" weakened form of the flu virus, but it has been so weakened it cannot give you the flu. Both of these vaccinations have specific requirements, so discuss your concerns and questions with your health care provider to determine which one is best for you. For additional information see the Center for Disease Control and Prevention website: www.cdc.gov/flu

Upcoming Training

Click [here](#) for full class schedule

**Food Safety Managers
(B-322-2101):**
27-28 Oct, 24-25 Nov

**DoD Pesticide Applicator
Certification (B-322-1050):**
TBD

**Shipboard Pest Management
(B-322-1075):**
12-13 Nov

**Shipboard Sanitation Certificate
(B-322-1100):**
18 Nov

**DoD Pesticide Applicator-Cat 8
only-(B-322-1074):**
TBD

TRI-Service Food Code
29-30 Oct, 9-10 Dec

For further info contact:

NEPMU2NorfolkEducationandTrain-ing@med.navy.mil

**Lab Identification of Malaria
(B-322-2210):** 19 Nov

CPO comes to NEPMU-2

By LTJG Learlino Bluiitt and ENS Jhermayne Bullock, Environmental Health Officer

In case you missed it or haven't heard, NEPMU-2 hosted its first ever CPO course in September. I know to Navy folks CPO means Chief Petty Officer, and September is Chief season, right? You're correct! It is chief season in September, but that's not the CPO I'm talking about. I'm talking about the Certified Pool Operators Course. ENS Jhermayne Bullock was the first to introduce this course to NEPMU-2's leadership, and LTJG Bluiitt contacted SwimMetro, located in Richmond, VA and NEPMU-2's training director Mr. Jeff Bolden to begin the logistics and administrative process to make this course a reality. Ms. Gwen Taylor, Certified Pool Operator course instructor, taught EHOs and PMTs from NEPMU-2 and a few personnel from the Navy & Marine Corp Public Health Center for three days. The first two days were the Certified Pool Operators Course and the third day was the Certified Pool Inspectors Course. The course provided EHOs and PMTs with a professional certification that is highly recommended in the civilian sector. Most importantly, NEPMU-2 will now be able to develop a pool course that will provide in-depth water chemistry to our preventive medicine departments at shore installations.

ENS Jhermayne Bullock, EHO collects pool samples for the CPO course hosted at NEPMU-2.



Did you know?

- An egg contains every vitamin except vitamin C.
- Over 2,500 left handed people are killed a year from using right handed products.
- For every human there are 200 million insects.
- More people are allergic to cow's milk than any other food.
- You are more likely to be killed by a champagne cork than by a venomous spider.
- The average bed contains over 6 billion dust mites.
- Bats always turn left when exiting a cave.
- 42% of men and 25% of women do not wash their hands after using a public toilet.
- There is no such thing as a naturally blue food.

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RESOURCE LINKS

Instructions

Navy Medicine Publications

PrevMed Topic Page

NMCPHC (NEHC) supported page of Preventive Medicine topics and resources

USAPHC

U.S. Army Public Health Command

WHO Fact Sheets

World Health Organization publications and fact sheets

AFPMB

Armed Forces Pest Management Board online

Bug Bytes Archive

Back issues of the NEPMU-2 Newsletter Available Online

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