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Fleet Public Health

Navy Environmental Health Center

Volume 5, No. 4

October, 2000

NEPMU-6
Pearl Harbor, HI

Public Health Training In East Timor

East Timor recently strove for independence from Indonesia in a violent conflict that destroyed much of the infrastructure. In June 2000, PACOM tasked NEPMU-6 to deploy an Environmental Health Officer (EHO) and one Preventive Medicine Technician (PMT) to Dili, the capitol of East Timor, to teach preventive medicine courses to the citizenry. HM2 Oliver Bascon, PMT, and I were deployed all of June to assist the US Support Group East Timor (USSGET) by teaching courses such as food sanitation and safety, water sanitation, children's health, and infection control for health care workers.

The food safety and water sanitation curricula were adapted from the lesson training guides (LTG) used at NEPMU-6. Infection control materials were developed from Navy guidelines concerning the handling of biohazardous materials, clinical waste, sharps, and the Navy AIDS/ Blood-borne pathogen training. The children's health course was developed from the Navy's "Healthy Kids Keep Everyone Healthy" program materials used to teach basic health and sanitation at Navy-sponsored schools and daycare facilities. We prepared handouts and LT Locke, NEPMU-6 EHO who was already on-site as the medical planner in support of USSGET, arranged for translation. Our curriculum materials were shared with UNICEF and United Nations Transitional Authority East Timor health promotion programs. Courses were conducted not only in Dili, but also two outlying villages, Ermera and Liquica. More than 900 students attended the courses over a three-week period.

Classrooms were always full of kids, eager to learn about personal hygiene and vector control measures. Standing to the PMT's right is Mario, an Ermerese interpreter. The language of East Timor is Telun. (Photo by Capt. Denise Shorb, USAF)

In addition to the courses taught, we did participate in other activities. We assisted USSGET and Australian preventive medicine personnel in the treatment of over 700 bed nets and the delivery of over 5,000 nets to UNICEF. We also participated in mosquito and fly surveillance projects;

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Inside this Issue:

From the S.E.L.

A CULTURE OF FITNESS

Aloha. I recently attended a Chief of Naval Operations All Hands Call on Oahu with our former CNO, Admiral Johnson. The new PRT Program was a hot topic at this call. Some Sailors felt that the program provided a disincentive for those who could not perform well in any one area and thus, had their final score restricted by how well (or how poorly, depending on who posed the question) they do in their weakest category. In addition to answering the PRT questions, the CNO brought up two important points: First, that the leadership is listening; if you find that elements of the program are counterproductive, let your leaders know and your concerns will be addressed; And secondly, the goal of the program is to create a "Culture of Fitness." This means getting away from the semi-annual PRT as a chore or an end in itself and creating a climate where exercise, health and fitness are an every day part of Navy life.

In passing the word to those who could not attend CNO Call, I didn't dwell on the PRT Q & A. It was only later that I realized why; over the past year at NEPMU-6, a 'culture of fitness' has been developing to the point where we take it for granted. At any given lunch time three-fourths or more of our military staff can be seen at the gym, running on the base or swimming at the pool; given the number of staff usually deployed or TAD, that's everyone. Exercise and nutrition are frequent topics in the break room and hallways; and email invitations to participate in triathlons, weekend ocean swims, and even marathons, are common. 'Experienced' staff members have been getting 'newcomers' started and keeping them, as well as each other, motivated. Being in Hawaii certainly doesn't hurt either; the Islands do seem to make people want to get or stay in shape.

This is not to say that we are a bunch of buffed out, Warrior-Gods (*at least not yet*) and work frequently intervenes, but the mindset making health and fitness a priority is unmistakable. Even the small number of staff on remedial PT scored 'Outstanding' on the most recent test. This is largely due to leadership making fitness a priority; PRT Coordinators who make the extra effort to motivate, assist and inform the staff; and a crew that knows a good thing when they see it.

As little as a year ago I remember discussing "the PT problem," when excuses outnumbered participants, with the troops and the Officer in Charge. As a reformed BF% failure, I didn't want anyone else to suffer similar consequences. After some good ideas and a lot of effort from the staff, it is now difficult to remember the days when fitness wasn't a part of Unit life. I am convinced that this can happen anywhere.

HMC (AW/FMF) Michael DURAN

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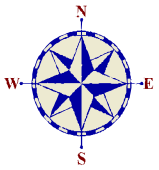
From the OIC of NEPMU-6:

A Reflection on a Modern Sea Story. . .

or Can One Sailor Make a Difference?



Let me tell you about a Sailor. This Sailor was kicked out of high school at the age of seventeen for telling his English teacher to "go to ----." Of course the fact that he had smuggled a live skunk to school in his tuba case and released it at the high school dance just added to the reasons for his dismissal…. that and the firecrackers he lit off at school.

Life had not been easy. The boy's father abandoned his mother and his family at an early age. His family income was below the poverty line but his mother stubbornly refused government assistance and worked for minimum wage.

As a high school dropout from a small town in Texas he found his way to the recruiting office and joined the Navy at the age of 17. On his first multiple choice examination at boot camp he rebelliously circled all the answers to each question and was promptly sent to sea duty where his ship soon deployed.

He describes a series of humiliating incidents aboard ship that were painfully character- building. Because he was the most junior Sailor aboard he did all the scut jobs and recalls his more senior shipmates "spilling" their chow plates on the mess deck for him to clean up. He thought to himself that the best "revenge" would one day be his own success. He was growing up.

A caring "sea-daddy" encouraged him to take a math test. The high school dropout scored the highest score in the Navy. Soon he was teaching algebra to his shipmates. Then he began taking college courses. After an honorable discharge from the Navy he completed a bachelor's degree in physics, a master's degree and then a PhD in computer science and engineering, all within 8 years.

This high school drop out and former Sailor went on to be the first American ever to launch three separate back to back billion-dollar computer companies---Silicon Graphics, then Netscape, and most recently Healtheon (now Healtheon/WebMD).

The Sailor was Jim Clark and I abstracted the above from a recent book, *The New New Thing: A Silicon Valley Story* by Michael Lewis (W.W. Norton and Co. 1999). The book tells the story of Clark, Silicon Valley, and the Internet revolution.

My first thought after reading about Jim Clark and his brief Navy career was that this was one Sailor who has REALLY made a difference. But then I wondered just WHO was that one unnamed shipmate who took the young Clark under wing and offered him direction and recognized his unique potential in the first place? That Sailor had made a difference too. Each one of us has within us the potential to make a difference.

Each one of us looks for meaning in our work. None of us could survive day after day at work that had no meaning. But it is up to each one of us to seek out and define the meaning that our work has for us. It is also our human nature to strive to improve…to grow. At NEPMU6 we have Sailors constantly striving to improve educationally: several have recently achieved college degrees, and others are working towards degrees, and one Chief is closing in on his Ed.D. But formal education is only one way we improve. Others have made significant strides in personal health, fitness, leadership, computer and technical literacy, and one of our staff is pursuing public access television production. What is remarkable is that this progress continues, in spite of the daily demands of their jobs.

This miracle of human growth and progress is occurring around us all the time. We grow so accustomed to it that we take it for granted. That is a mistake. The Navy encourages our personal growth and constant improvement throughout our career through the many courses it offers, the opportunities for advancement, opportunities for leadership, the recurring command review process, and even through the gentle prodding of the biannual PRT.

Growth means change and change is stressful. But it's worth it because the alternative…stagnation is worse.

Perhaps only a few of us will eventually leave the Navy to start million- dollar companies like Seaman Jim Clark. However, each one of us can find meaning in the work of the defense of our country and commit ourselves to personal growth and improvement in our personal lives. We can also reach out to encourage a fellow shipmate. One Sailor can indeed make a difference. I think to myself that we never fully know what incredible creative and productive potential lies hidden inside those we work side by side with every day. Who knows, maybe one day we will be reading about one of you.

CAPTAIN H. JAMES BEECHAM, III

Chinese Delegation Visits NEPMU-6

USCINCPAC representative discusses field detection of infectious diseases with a General (center) and his aide, both of the Chinese People's Liberation Army. The General and his delegation visited NEPMU-6 at Pearl Harbor for the final stop of their orientation tour of U.S. military medical facilities.

Representatives from NEPMU-6, and Fleet Marine Force Pacific Surgeon's office and the Chinese People's Liberation Army, discuss the detection of lead in potable water.

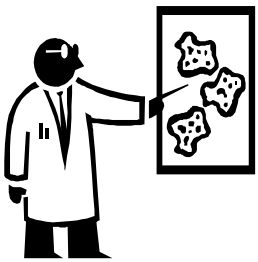
Public Health Training in East Timor

(Continued from page 1)

provided technical assistance on methods to increase sanitation levels during site visits to area restaurants; and conducted sanitation site visits at water treatment plants, providing technical input.

Lessons learned from our mission in East Timor include: the need to formalize specialized LTGs for teaching public health in humanitarian missions; and, by the very nature of the post-conflict, chaotic conditions, that there is never enough time to get everything done. We were deployed for thirty days and were still establishing contacts for classes until the very last day.

The civilian staff are all volunteers of Assistance Medical International (AMI). To the side, some local girls, waiting for their dental appointments, ease their way into the photo. (Photo by unidentified Ermera Clinic dental patient.)



LT Michael R. KUBLER,
Environmental Health Officer

Personal Protection from Vector-borne Diseases During Military Deployments

Marines, Sailors and Soldiers may be exposed to several insect-borne diseases when deployed to foreign countries. Insect repellents, prescription medicines, nets and other barriers are available to all military personnel. These items, often referred to as personal protective equipment or PPE, effectively protect individuals from insect-borne diseases. In situations where a combination of protective measures is warranted, full protection will be dependent on effective use of all prescribed measures. All repellents and medicines noted here are safe. Further, military issue repellents are the most effective repellents available. Claims that repellents sold at sporting good stores or Avon products are more effective are false, and unnecessarily place personnel who use them at risk.

An Entomologist and two PMT's conduct entomological surveys at the Thung Song camp during Exercise Cobra Gold 2000. (Photo by LT Brian Prendergast)

Mosquitoes carry several militarily significant diseases, including malaria, dengue fever, yellow fever and several viruses, such as West Nile fever, and Japanese encephalitis. Fleas spread plague. Ticks spread Lyme disease, and mites vector scrub typhus. Several other diseases are vectored by insects, ticks and mites.

Many strategies are employed to protect personnel from these diseases. Yellow fever and Japanese encephalitis can and must be prevented through vaccination. Malaria control depends on anti-malarial medications, repellents and bed nets. However, no one technique is likely to be one hundred percent effective, so all methods must be employed. Repellents are the only protection available for dengue fever. Repellents and barriers, such as bed nets and repellent-treated battle dress uniforms, protect against all of these diseases as well as nuisance insects.

Preventive medicine personnel will determine if malaria is a threat in an area of operation, will provide guidance on the necessity of malaria chemoprophylaxis, and will prescribe appropriate antimalarial medications for personnel going to areas with endemic malaria. Malaria pills are taken before there is any evidence of infection. It is very important to adhere to prescription regimens. Two medicines are routinely prescribed, a chemoprophylaxis agent and a terminal chemoprophylaxis agent. Chemoprophylaxis, which usually uses the drugs doxycycline or mefloquine, kills malaria parasites in blood, and will prevent parasite buildup and development of clinical symptoms. These drugs must be taken before, during and after deployment to malarious areas, again according to prescription regimens. Terminal prophylaxis kills stages of malaria that may survive in the liver. These stages may otherwise remain dormant for several decades and later reenter the blood to cause illness. Terminal prophylaxis consists of the drug primaquine. Primaquine is taken daily beginning the day personnel leave a malarious area and continuing for a total of fourteen days.

Bed nets provide a physical barrier between people and biting insects. The net should be hung inside the four support poles. It is important to tuck the net under sleeping bags or iso-mats, so that insects cannot enter where the net might otherwise hang loosely over the sides of the cot. Mosquitoes often rest under cots, especially if it is cluttered beneath the cots. The underside of cots should be inspected daily to flush resting mosquitoes. Again, nets must be tucked in to prevent mosquitoes from entering the net while a person sleeps. Treating bed nets with the repellent permethrin will increase the effectiveness of mosquito control because most mosquitoes that land on the outside of the net will die. The type of mosquitoes that transmit malaria bite in the evening, making bed nets a crucial part of malaria prevention.

Bed nets must be used even when mosquito populations seem low. Malaria vectors are often present in very low numbers even at times of explosive outbreaks. Troops are unlikely to notice five to ten bites per evening. This biting rate may be more than sufficient to support disease transmission.

Two types of insect repellents, DEET skin repellent and permethrin clothing impregnate, should be used at all times. The military-issue skin lotion contains 33 percent DEET. This repellent has been used safely by the military

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Personal Protection from Vector-borne Diseases During Military Deployments

(Continued from page 5)

since 1958. The standard military issue DEET skin repellent, which has been used since 1990, is formulated for extended protection. In a tropical environment, it is 95 percent effective six hours after application. Permethrin uniform repellent is the most effective clothing impregnate available, and is available in both an aerosol formulation and a concentrated solution. The aerosol formulation is effective through six uniform launderings. The concentrate formulation, which must be applied by a certified pesticide applicator, has the advantage of being effective throughout the life of the uniform. Factory treated uniforms have recently become available. It is important for individuals to understand when and if their uniforms were treated and when retreatment is necessary. Treatment may be coordinated by either preventive medicine personnel or by the individual.

Repellents protect against all vector-borne diseases.

An Entomologist hangs a dry ice baited light trap for mosquito surveillance at Exercise Cobra Gold 2000 in Thailand. The dry ice vaporizes into carbon dioxide, which attracts mosquitoes, much like a person's exhaling carbon dioxide. (Photo by HM1 Robert Libarios)

Dengue fever is transmitted by a mosquito that usually bites during the day. The only way to prevent dengue fever is to avoid bites of infected mosquitoes. Chemoprophylaxis for protection against this virus is not available. It is important, therefore, to use repellents throughout the day. DEET should be worn on all exposed skin. DEET and Permethrin should be used together. Individuals should keep DEET with them at all times in the event that they roll their sleeves or remove part of their uniform in the middle of the day.

Several techniques are used to prevent vector-borne

A Preventive Medicine Tech hangs mosquito light traps at Cobra Gold 2000 in Thailand. Captured mosquitoes will be analyzed to determine whether or not they are carrying malaria. (Photo by LT Brian Prendergast)

diseases. No single prevention strategy is completely effective against any particular disease. Possible resistance of malaria parasites to antimalarial medications makes it necessary to apply repellents as a second defense against malaria, and as a defense against other vector-borne diseases. No strategy is completely effective against every vector-borne disease. Moreover, potential misapplication of any single method makes redundancy in protection absolutely necessary. It is easy, though very undesirable, for individuals to forget to take malaria pills or to apply skin repellents too infrequently. Therefore, it is necessary to stress that personnel MUST use both as diligently as possible.

LT Brian F. PRENDERGAST
Entomology Department,

Planning for Cobra Gold 00, Another Learning Experience

Early this year NEPMU-6 received a message tasking the unit to participate in the annual multinational, joint-service Exercise Cobra Gold in Thailand. As members of highly deployable units, we must all learn how to properly prepare for such a big exercise. Attending the Initial Planning Conference (IPC) is critical. During the IPC all of the military components get together and determine the plan of action and the events that will take place during the exercise. Each component needs to ensure that it can accomplish the tasking. In the case of medical units, taskings are detailed in the Annex Q of the exercise plan, which is the medical tasking section of the completed plan.

Next is to confirm that your unit is on the TPFDD (Timed Phased Force Deployment Data). This is a crucial item that can occasionally be a source of some frustration. TPFDD is the process by which all personnel and cargo are scheduled to arrive at and depart from the designated exercise area. By the time the Middle Planing Conference arrives, one should have a basic idea about specific responsibilities, as well as a good idea of the deployment schedule for your team and cargo. However, don't count on things to go smoothly. As the master plan gets further developed, airlift and seats are always tight and the competition for them is keen. Additionally, there may be further taskings that you may not be equipped to take on. The key is to work closely with the Medical Planners.

Last, but not least, make sure you attend the Final Planning Conference (FPC). During FPC the entire plan gets the final blessing from all commanders, everything is put on paper and no further changes are allowed. By the end of FPC you should know the windows for departure and arrival for your team and cargo. Nevertheless, communication should continue between your unit representative and the POMIs before, during and even after the deployment. This entire process can be officially learned at the Plans, Operations, and Medical Intelligence (POMI) Course, offered by the Naval School of Health Sciences in Bethesda, Maryland.

For Cobra Gold 2000, NEPMU6 was assigned to be one of two preventive medicine assets for the U.S. Army component in Tung Song, Thailand. Early on, we were not familiar with the Army's expectations for a preventive medicine team. Upon arrival, we noticed that the only "game in town" in preventive medicine for the camp was the Navy component, or as the Army called us, "the Marines." Thanks to detailed preparation and guidance from superiors at our unit, our seven-member team efficiently deployed to Thailand in mid-April 2000. Our gear included a complete entomology laboratory, for conducting mosquito control and vector surveillance. A complete microbiology laboratory was also taken to Thailand to assist the Naval Medical Research Institute Center on a medication treatment trial for enteric infections. We also brought other preventive medicine assets, such as complete water testing capabilities, food service inspection gear, and some environmental health equipment. In addition to all the "science" gear, we were supplied to survive possible "billeting accidents." This proved to be useful as, upon arrival, no billeting was available for our team for two weeks. We built a rudimentary "condominium" in one afternoon, and it was the envy of the entire camp. We were thankful for inflatable mattresses, battery operated compact disk players, and baby wipes. Additional gear included MREs, cots, water, chorine tablets, bed nets, and an enormous amount of miscellaneous MMART-type supplies. Throughout the exercise we provided support to 1200 Army troops as well as camps at the other three sites located a few hundred miles away. Our team received calls day and night; everything from water testing to scorpion control and even calls regarding snakes visiting head and shower sites. We even made a "house call" in re-

A Microbiologist assisted the Naval Medical Research Center on their treatment and surveillance trial for enteric infections at the Thung Song, Thailand satellite laboratory during Cobra Gold 2000
(Photo by HM2 Robert Ramirez.)

A lab tech processing samples at the NEPMU-6 microbiology laboratory in Thung Son, Thailand during Exercise Cobra Gold 2000. (Photo by HM1 Robert Libarios)

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Planning for Cobra Gold 00, Another Learning Experience

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sponse to a very long intestinal parasite, shed by a frightened soldier in the middle of the night.

Thanks to long and careful planning, we were able to take care of all preventive medicine needs of the camp for the entire length of the operation. Attending all the Planing Conferences is crucial in the process; work together with the Medical Planners. We learned a lot! Never say no, be prepared, and expect the unexpected. You are the expert!

An Entomologist applies residual pesticides for mosquito control at Exercise Cobra Gold 2000, Thung Song, Thailand.
(Photo by SPC Vivian Quevarra)

LCDR Carlos LE BRON, Ph.D.
Head, Microbiology

PCB: A Familiar Lesson Revisited

SCENARIO: It all started with a phone call from the ship's doc asking me to come on board to check this mysterious substance that was leaking from the electrical cables in the IC room. The ship's public address system, (1MC), on this 33 year-old LPD, became nonfunctional. As the IC troubleshooters rushed to fix the system, they noticed this oily, green, gel-like substance leaking from the cables of the amplifier oscillator. One of the ICs wiped it off with a rag. By the time the shop supervisor realized that the material could be PCB (polychlorinated biphenyls), five other people in the shop had touched the "green gel".

An NEPMU-5 IHO, examines the amplifier oscillator in the IC room of an LPD for PCB leaks.

I came on board the ship the next day and examined the mysterious substance. The physical characteristics exhibited by this substance all suggested PCB. Using glass fiber filters dipped in hexane, I took a couple of wipe samples from an approximately 100 square centimeter area. Laboratory results confirmed our suspicion. PCB was confirmed at concentrations of 2.84 and 5.94 micrograms per 100 square centimeters. The red flag went up. "Houston we got a problem."

WHAT ARE PCBs? Polychlorinated biphenyls are toxic chemicals belonging to the chlorinated hydrocarbon group substances. Generic synonyms for PCBs include chlorinated biphenyls, chorinated diphenyls, and chlorodiphenyls. They range in form and appearance from oily liquids to crystalline solids and hard transparent resins. These chemicals exhibit favorable physical and chemical properties, including high heat capacity, chemical stability, non-corrosivity to metals, low flammability, low vapor pressure, and low conductivity. They have therefore been used extensively as insulators and coolants in electrical equipment. To a lesser extent,

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PCB: A Familiar Lesson Revisited

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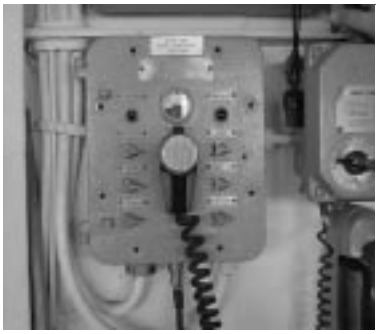
PCBs have been used in paints and lacquers, adhesives, varnishes, caulking compounds, plasticizers, hydraulic fluids, lubricants, waxes, and sealants.

HEALTH HAZARDS: PCBs can enter the human system through ingestion, inhalation, eye contact, and skin absorption. Inhalation of PCB is the most direct exposure route and is typically the most problematic. PCBs can cause adverse health effects on unprotected personnel with either brief or repeated exposure. Effects from short-term contact with significant concentration of PCB vapors or liquids include eye, nose, and throat irritation; headaches; and a skin rash known as chloracne. Repeated exposures can result in severe skin irritation, respiratory irritation, digestive tract damage, and damage to the liver. Systemic intoxication, a result of severe overexposure, is characterized by nausea, vomiting, weight loss, jaundice, edema, and abdominal pain, and can be fatal.



PCB leaks were also found in the remote microphone control station, located in the ship's bridge.

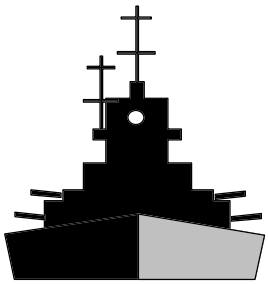
LAB RESULTS: The wipe samples were taken to screen for the presence or absence of PCBs, and do not indicate the level of inhalation exposure. Air samples must be taken to estimate their inhalation exposure. In this case, the low concentration of the PCB found in air samples obtained, the inherent low vapor pressure, and the one-time, short-duration exposure precluded personnel exposure above the permissible exposure limit.

ACTIONS: A remaining concern in this incident was to determine if any of the individuals who had skin contact with the material had any skin lesions at the time the incident occurred. As mentioned earlier, PCB can be absorbed through the skin, which can be enhanced by any opening in the skin. The Medical Department tracked down every individual that might have had contact with the material, particularly the six ICs that worked in the shop. They were interviewed and examined, with particular attention to any skin lesions on their hands and signs of chloracne. All these examinations were documented on an SF 600 for RPO (record purposes only). Those examined were also briefed on the health hazards of PCBs, and symptoms to watch for that would indicate exposure. Liver profile testing was not performed, based on the low concentration and negative determination of significant exposure.

Cleanup of affected equipment was done in accordance with the PMS (Periodic Maintenance Schedule) card requirements and with strict adherence to the use of proper PPE (Personal Protective Equipment). The ship was also advised to post a one inch by two inch PCB label on all the affected equipment in accordance with the NAVSEA requirement (NAVSEA-S95593-A1-MAN-001). An all-hands PCB hazard awareness training was scheduled for the crew of the ship. All these measures were taken to prevent further inadvertent exposure of ship personnel in the future.

LESSONS LEARNED: The perceived urgency to fix the 1MC led the ICs to ignore the presence of an unfamiliar substance in the amplifier oscillator. PMS cards for equipment with PCBs contain warning about potential leaks within the system and a list of required PPE to prevent exposure. Had the ICs taken the time to question the presence of the green gel and check the PMS card, much of the anxiety and effort of this incident could have been avoided. As the old adage goes: "an ounce of prevention...is worth a pound of cure."

LT A. R. LUMANOG
Industrial Hygiene Officer
Threat Assessment Team



Operation STRONG ANGEL at RIMPAC 2000

Planning and Our Changing Mission

Recently, in support of Combat Service Support Group-3 (CSSG-3) from Marine Corps Base Hawaii-Kaneohe Bay, NEPMU-6 provided basic environmental health support for a humanitarian assistance exercise during "Rim of the Pacific (RIMPAC) 2000. RIMPAC is the largest maritime exercise in the Pacific Ocean. The armed forces of Australia, Canada, Chile, Japan, South Korea, the United Kingdom, and the United States participated, dealing with a number of high-technology scenarios that simulated real-time naval battles. The multi-national, multi-faceted naval exercise also included the humanitarian exercise, dubbed "Strong Angel," involving U.S. Marines, Red Cross representatives and personnel from the United Nations. This was the first humanitarian assistance exercise in the 30-year history of RIMPAC.

In addition to defense, the military is often called upon for humanitarian assistance following natural disasters, regional wars, famine or epidemics. These kinds of situations create huge numbers of people who need to be relocated, sheltered, fed and given medical care and compassion. For the first time ever, refugee-actors lived in a mock camp, under similar conditions to those set up by the United Nations in the Sudan, Bosnia, Turkey and elsewhere, in order to rehearse refugee camp management and care.

Organizers of Strong Angel realized that any effort to deliver aid in case of disaster had only been an emergency reaction to that disaster at that time. There had never been a chance to practice the management of refugee camps and the new technology being developed for them. Provision of health care in a humanitarian crisis, transmitting reliable biomedical sensor data, public health monitoring, health education and medical knowledge-on-demand services were tested in a realistic environment. This mock refugee camp provided a realistic measure for determining the actual usability, reliability and operational functionality needed to support such a variety of biomedical communications applications, which will be needed to effectively respond to real world needs.

The main site for Strong Angel was in the northwest region of the Big Island of Hawaii; in particular a barren lava field at Puu Paa, which housed the mock refugee camp. As previously mentioned, the conditions could not have been more realistic for a training exercise. Strong winds knocked down tents and constantly kicked up dirt making it almost unbearable to see or breathe, not to mention keeping anything clean. Goggles and cravats were provided while supplies lasted.

Hand washing (or lack of) was the number one sanitation issue in battling to conditions. There were lyster bags strategically located throughout the camp. However, they were ineffective due to the dirt being blown onto your hands as they were being washed, which attracted more dirt. Secondly, it was a constant effort trying to keep the water clean, from Marines (untrained in proper water sanitation) who filled the water bulls and from personnel taking care of their hygiene needs with the water bulls. Also, after a few days, mosquitoes became a nuisance. Lastly, there was a problem with the port-a-john contract, which you could say had things 'stacked up' for awhile. All of these are key ingredients for a catastrophe.

What does all this have to do with preventive medicine? Planning, planning, and more planning! Sure we all plan during *routine* deployments, when missions are familiar and time is plentiful. But once an operation begins, planning is difficult, if not impossible. That is why PREVMED personnel must take the initiative to become actively involved in the pre-deployment phase of *all* deployments.

Chapter 9, Preventive Medicine for Ground Forces, of the P-5010 reminds us that medical planning is where good preventive medicine starts. And, as a minimum, pre-deployment measures should include the following:

a. Compile preventive medicine information relevant to the area of operations (AO) and present it to the unit surgeon or commander, along with recommendations for minimizing casualties due to preventable health threats.
b. Confer with other unit departments including engineering, intelligence (G-2/S-2), operations (G-3/S-3) and supply/logistics (G-4/S-4) to ensure adequate support for provisions, potable water, and availability of protective clothing and equipment, netting, repellant, and other necessities.
c. Provide preventive medicine briefs/training on expected health threats in the AO to deploying personnel.
d. Assist with health record reviews during pre-deployment medical preparation to ensure maximum readiness of unit personnel.

As the need for exercises like these continue, so does

(Continued on page 11)

New OIC at Seven

Commander Rhodes enlisted in the Navy in June 1977 and attended boot camp, Basic Hospital Corpsman School, and Field Medical Service School in San Diego. He then served as a general duty Hospital Corpsman at Naval Hospital Bremerton, Washington. After Bremerton he was selected to attend the Navy Preventive Medicine technology School at Naval Hospital Oakland in 1979 where he received his Associate of Science, Environmental Health from Merritt College, Oakland California and was assigned to the USS John F. Kennedy CV-67 as a Preventive Medicine Technician.

While on board the Kennedy, Petty Officer Rhodes completed his Bachelor of Science Degree in Biology from the University of the State of New York. He applied for and was selected to attend the Naval Aviation Officer Candidate School in Pensacola Florida, where he graduated with honors and received his commission as Ensign, United States Navy in July 1981. He was recommissioned Ensign, Medical Service Corps, as an Environmental Health Officer in December 1981 and received orders to Naval Regional Medical Center Long Beach, California.

At Long Beach ENS Rhodes served as the Head, Environmental Health Department providing comprehensive preventive medicine program support to the Naval Station, Naval Shipyard, and Naval Regional Medical Center Long Beach. During this period he also attended California State University Long Beach and Graduated in May 1986 with a Master of Public Health degree in Community Health Education.

Following Long Beach LT Rhodes was assigned as Environmental Health Officer, 3rd Medical Battalion, 3rd Force Service Support Group, 3rd Marine Expeditionary Force, (III MEF), Okinawa Japan where he served in the Republic of Korea providing broad spectrum Preventive Medicine support to deployed Marine Forces.

In September 1989 he reported to the Naval Hospital Cherry Point North Carolina where he served until June 1993 as Director, Occupational Health and Preventive Medicine Service. During this time he was selected for promotion to LCDR and deployed to Southwest Asia in support of Operations Desert Shield and Desert Storm as Head, Preventive Medicine Unit, 2nd Medical Battalion, 2nd Force Service Support Group, 1st Marine Expeditionary Force. In this capacity he led 28 Officer and Preventive Medicine Technicians in the provision of a wide ranging and comprehensive operational combat field preventive medicine program that significantly reduced the incidence of disease and illness among U.S. Marine Corps Forces participating in the conflict.

Following Cherry Point, LCDR Rhodes attended the U.S. Marine Corps Command and Staff College, Quantico Virginia, graduating in June 1994 with a Masters in Military Studies from the United States Marine Corps University. He was then assigned a utilization tour as Executive Officer, 1st Medical Battalion, 1st Force Service Support Group, 1MEF, Camp Pendleton, California through September 1997. In February 1999 he was appointed Director, Branch Medical Clinics, Naval Hospital, Camp Lejeune, where he managed the overall operation of six Branch Medical Clinics providing Primary Health Service to Camp Lejeune Marine Corps forces and served as a member of the Command Executive Steering Committee.

Commander Rhodes's decorations include the Navy Commendation Medal with two gold stars, Navy Unit Commendation, Navy Good Conduct Medal, Sea Service ribbon with 3 stars, Fleet Marine Force ribbon, Meritorious Unit Commendation, Southwest Asia Service medal, and Kuwait Liberation medal. .

He is married and has two children.

LT Karen S. CORSON
Environmental Health Officer

Operation STRONG ANGER at RIMPAC 2000

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the need for thorough planning. Not everyone is lucky enough to deploy to Hawaii where there are not many environmental hazards of concern. It is expected that the lessons learned from Project Strong Angel will be utilized in the follow on project, in the fall of 2001. During the Humanitarian "Mission to the Americas," the USNS MERCY Naval hospital ship will be deployed to the west coast of Central America to three ports devastated by hurricane "Mitch."

HM3 Derek BOYD
Preventive Medicine Technician,

Filth Flies and Military Operations:

Part Two of Two Parts

Continued from Part One in the July Issue of the Fleet Public Health

Myiasis, the infestation of living human or animal tissue with fly larvae, can impact military exercises and operations. Increasingly strong evidence suggests that flies transmit several pathogens, particularly diarrheal agents, yaws, and eye diseases, as discussed in part one (July 2000 Fleet Public Health). While we are presently uncertain about the degree to which filth flies cause human illness through pathogen transmission, there is no argument concerning the potential for human morbidity and mortality due to larval fly infestation of human and animal tissue.

The larvae may feed on the host's living or dead tissue (gangrenous or necrotic). Forms of myiasis include enteric (digestive), rectal, urogenital, auricular (ear), cutaneous, and nasopharyngeal. When associated with wounds, myiasis is said to be traumatic. Furuncular myiasis results in boil-like lesions.

Accidental myiasis is usually the result of ingesting maggot-contaminated food. Flies in this group don't require or seek a living body to invade. In fact, most ingested fly larvae are unable to complete their life cycles in the human digestive system. Those larvae that do survive can cause enteric myiasis, leading to symptoms such as malaise, nausea, vomiting, pain in the abdomen, and bloody diarrhea. Living and dead larvae may pass in the stool. Over 50 species of fly larvae are documented to cause enteric myiasis. The most common are the housefly, *Musca domestica*, the little housefly, *Fannia canicularis*, the latrine fly, *Fannia scalaris*, and the false stable fly, *Muscina stabulans*. One of the most problematic fly species associated with enteric myiasis is the cheese skipper, *Piophila casei*. Cheese skipper adults lay eggs on cured meats, old cheese, smoked fish and other materials. Later, larvae from those eggs penetrate the surface, particularly in meat, and go unseen. When humans unintentionally consume the cheese skipper larvae, the maggots pass through the digestive system alive, resulting in serious intestinal lesions. Other fly larvae that can survive the human digestive system include the black soldier fly, *Hermetia illucens*, and the drone fly, *Eristalis tenax*. Both species are documented to cause severe gastrointestinal disturbances.

Another form of accidental myiasis is rectal, in which flies that normally breed in feces lay eggs in fecal material around the anus. Rectal myiasis can occur in humans living in filthy conditions, especially infants and sick adults who are unable to care for themselves. Species of excrement feeders, such as the drone fly, little housefly, latrine fly, false stable fly, as well as certain flesh flies (Sarcophagidae), are documented to inhabit the rectum or terminal part of the intestine.

Facultative myiasis occurs when species that normally feed on feces or carrion adapt to live as successful parasites. Maggots of these flies can develop quite well in a living host, but are not dependent upon other living animals for larval food. Urogenital and traumatic facultative myiasis occur most frequently.

Urogenital myiasis usually initiates at night in warm weather when people sleep uncovered. Egg laying may be stimulated by discharge from diseased genitals. The result is obstruction, pain, pus, mucus, bleeding and a frequent desire to urinate. Larvae can be expelled with urine. Flies most commonly associated with urogenital myiasis are the housefly, the little housefly, the latrine fly, and the false stable fly (Calliphoridae).

Flies associated with facultative traumatic myiasis are usually carrion breeders. Blowflies (Calliphoridae) are most commonly involved, but flesh flies (Sarcophagidae) and the housefly are documented to infest wounds as well. Normally attracted to the rotting flesh of carrion, these flies are also drawn to foul smelling, neglected wounds, especially if patients are helpless. Infestations can be quite painful. The maggots feed primarily on necrotic tissue, but they may also invade living tissue. Flies documented to cause facultative traumatic myiasis include the black blowfly, *Phormia regina*; a green bottle fly, *Phaenicia sericata*; the secondary screwworm, *Cochliomyia macellaria*; and certain Calliphorids in the genus *Chrysomyia*.

Flies involved in obligatory myiasis are incapable of reproducing without a living host for larvae to feed upon. Obligate myiasis flies include the blowfly (Calliphoridae), the flesh fly (Sarcophagidae) and bot flies (Oestridae & Gasterophilidae).

The primary screwworm, *Cochliomyia hominivorax*, is a true parasite that survives only on living animal flesh. Adult females do not lay eggs on cold-blooded animals such as reptiles and amphibians, nor in carrion or decaying meat or vegetables. The primary screwworm is notorious for decimating livestock. Modern control measures

Filth Flies and Military Operations: Part 2 of 2 Parts

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have nearly eradicated the species from the United States, with only sporadic re-infestations through importation of infested livestock or poor preventive measures. Viable populations occur in Central and South America. Human cases are most likely to occur where livestock infestations are prevalent. Egg-laying females are strongly attracted to open wounds, sores, and even tick bites, where they lay up to 2,800 eggs in batches of 10 to 400.

The bot and warble flies (Oestridae) are obligate parasites of animals that often infest livestock and pets. However, they can infest humans who work with or live near infested animals. Adult bot flies are distinguished from other flies by their large, hairy, bumble bee-like bodies. Larvae are large and often armored with spines that make removal from flesh difficult. In humans, the horse bot maggot, *Gasterophilus intestinalis*, penetrates unbroken skin and burrows freely through flesh causing itching "creeping" myiasis. Humans aren't the horse bot's normal host, since the maggots are unable to survive. However, the maggots of ox warble, or cattle grub, *Hypoderma bovis*, survive quite well in humans, often with serious consequences. Cattle grub larvae penetrate unbroken skin and wander in the arms and legs causing dermal, creeping myiasis with severe pain. Local paralysis may occur due to invasion of the spinal cord. Sheep bots, *Oestris ovis*, do not survive in humans, although they cause pain and irritation, most commonly in the eyes.

The human bot fly, *Dermatobia hominis*, is common in parts of Mexico and South America. The human bot fly resembles a blue bottle fly, and infects a very wide range of animals, as well as humans. The adult female captures a blood-sucking insect, such as a mosquito, black fly, horse fly or stable fly, and deposits an egg on its body. When the mosquito feeds on a human, the bot fly larva crawls off the mosquito and enters the human through the mosquito bite wound. The human bot fly larva doesn't wander in the flesh, but produces a boil-like lesion (furuncular myiasis). The larva lives in the host for about six weeks, then exits the wound and drops to the soil to pupate. When the larva enters the bite wound, it only causes an itching sensation; however, intense pain will follow within three weeks.

In the history of the US Military, myiasis is rare. Recently, a case of traumatic screwworm myiasis was reported in a soldier wounded in action in Panama (Mehr et al, 1991). A greater threat of screwworm myiasis would exist where medical treatment was not readily available, or where wounded personnel were neglected, such as in prisoner-of-war or refugee camps. The threat of urinary and rectal myiasis would be greatest in camps with inadequate latrine facilities. Again, refugee and prisoner-of-war camps are prime situations where morbidity from flesh infesting maggots is likely to be seen.

FILTH FLIES AS NUISANCE PESTS

The great amounts of filth and carrion encountered by military personnel during war, peace keeping, and humanitarian operations usually result in great numbers of filth flies. These flies may not only disrupt military operations by affecting human health, but in great numbers they can distract personnel from their work and can significantly degrade morale.

The housefly female is capable of producing about 120 eggs four to six times in her lifetime. Under favorable conditions, larvae from these eggs develop into adults in about ten days. The potential for a housefly population explosion in warm conditions during contingencies (poor sanitation, large numbers of refugees or prisoners of war, and numerous exposed cadavers) is high. Stable flies, *Stomoxys* spp., are among the few filth flies that bite. Although not associated with disease transmission, they can be a formidable nuisance.

Numerous anecdotal accounts exist of huge filth fly populations in Vietnam, and in Saudi Arabia and Kuwait during the Gulf War. In fact, as recently as 1999, entomologists addressed large filth fly populations (Calliphorids) at certain US Air Bases in Kuwait, where filth flies presented a severe annoyance to day workers and occurred en masse in dining facilities.

In Vietnam, huge fly populations existed in local villages that surrounded U.S. military camps. Preventive medicine fought a constant battle to control flies under these conditions. In many parts of the world similar situations still exist. In 1992-93, relief operations in Somalia encountered a similar situation. A combination of poor sanitation in Mogadishu, numerous livestock, and a large number of allied personnel made for a very large population of *Musca* sp. While no one measured the relationship of filth flies to disease during the relief operations, entomologists noted substantial complaints about filth flies from military personnel.

It is difficult to quantify the emotional effects of large numbers of flies on personnel in an already stressful environment. However, large populations of filth flies cer-

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Filth Flies and Military Operations: Part Two of Two Parts

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tainly distract personnel from their duties. Proper management of field conditions, waste facilities, and dining facilities will significantly reduce their numbers. This, in turn, will result in more attentive and effective personnel, significantly improving the chances for successful operations in garrison, onboard ship, and in the field.

Capt Armando ROSALES, USAF,

LT Brian PRENDERGAST, USN,

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My Summer Vacation in East Timor

I recently spent a one-month vacation in Dili and other towns in East Timor. It wasn't really a vacation. It was more like being in a steam bath for a month. The country was very hot and humid. By the time you took a few steps outside you were sweating profusely. It took a long time before I finally got used to it. A fan was not enough, as all it did was to blow warm air in your face.

My time in Dili was an experience I'll never forget. It was just like watching CNN, with UN and US soldiers moving about with semi-automatics or sidearms. There were white UN HMMV's everywhere, and UN helicopters and planes constantly flying overhead. It was a very loud and busy city. With all the commotion, you might have thought that you were in a war. Even so, the city itself was safer than many US cities. The Timorese are very friendly and are fond of Americans. Kids waved and greeted us with "hello American" every time we passed. In smaller towns, such as Ermera (about two hours south of Dili, high up in the mountains), people literally flocked to see us out of curiosity.

Ermera is a unique town. The people there are so devoted to Catholicism that every time the church bells rang, everyone stopped what they were doing, faced the church, and made the sign of the cross. It's almost like colors; the church bells ring early in the morning, noon, and at 1800. The locals there are the friendliest I've seen.

I was in Ermera for a week and worked with a dental team. We extracted close to a thousand teeth, the majority of the patients being under 18 years of age. It's funny, but more adults cried than those under 10 years old. We billeted with the nurses and doctors that were assigned to the Ermera clinic. Supplies were very limited and so were our surgical instruments. Electricity was only available from 1800 to 2200. Interestingly, we used a flashlight to help illu-

With limited dental equipment and electricity, the dentist and DT3 use a flashlight and barber's chair to perform an oral exam on an unidentified East Timorese patient. (Photo by Oliver Bascon)

(Continued on page 15)

Hail & Farewell

Welcome Aboard!

NEPMU-2:

NEPMU-5:

NEPMU-6:

NEPMU-7:

Fair Winds & Following Seas!

NEPMU-2:

NEPMU-5:

NEPMU-6:

NEPMU-7:

My Summer Vacation in East Timor

(Continued from page 14)

minate inside the patients' mouths for the dentist. The most productive time I had in East Timor was in this little town.

Our primary mission in East Timor was to teach the local food service employees, health care providers, and high school and elementary students about personal hygiene, dental care, and mosquito control. Some of the topics we taught were almost impossible to translate because most of the preventive methods were unknown to our interpreter. If you have ever played "pictionary," that's pretty much how we had to explain certain words or methods of prevention. For instance, it took us a while to explain "bleach." Luckily we got hold of a bleach bottle and much to our surprise, they knew what it was. And, because of their limited resources, we were often asked if we could supply them with various items such as mosquito bednets, slippers, and even water - things that we take for granted.

It was a long month but it was a good one, and I learned a great deal from this experience. We saw progress and results just from the short time that we were there and with just a handful of people. We asked our students to teach their relatives and friends what we taught them. We also suggested that the schoolteachers have a parent/teacher meeting to help us spread the word faster. We feel that we made a difference in East Timor. Everything we did affected each individual. So it was not really a vacation, but it was an unforgettable summer, nonetheless.

HM2 Oliver BASCON
EPIDEMIOLOGY DEPT

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A curious bunch of kids, eager to observe the Americans. An officer was merely polishing his boots, but still managed to draw an audience. (Photo by HM2 Oliver Bascon)

The friendly residents of Ermera – they love to have their picture taken.
(Photo by HM2 Oliver Bascon)

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