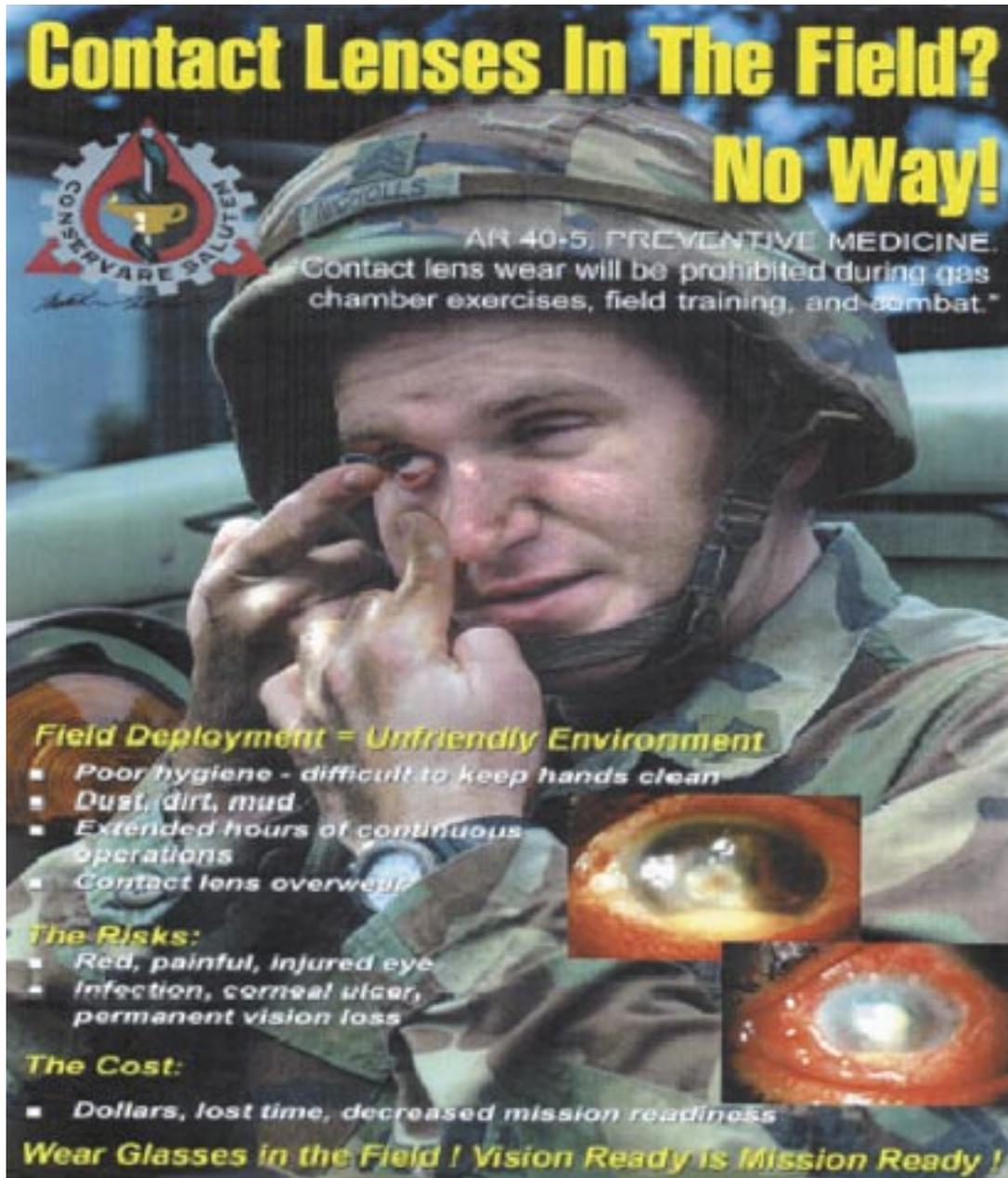


USACHPPM TODAY

Volume 9, No. 3

October 2002

A U.S. Army Center for Health Promotion and Preventive Medicine News Bulletin



Contact Lenses In The Field?
No Way!

AR 40-5, PREVENTIVE MEDICINE.
Contact lens wear will be prohibited during gas chamber exercises, field training, and combat.*

Field Deployment = Unfriendly Environment

- Poor hygiene - difficult to keep hands clean
- Dust, dirt, mud
- Extended hours of continuous operations
- Contact lens overwear

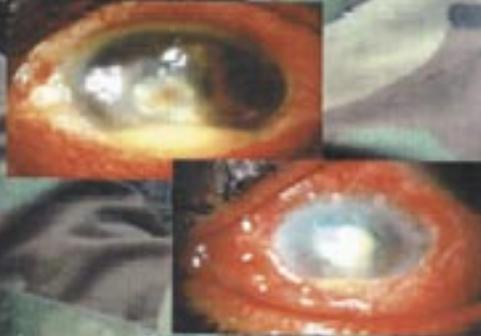
The Risks:

- Red, painful, injured eye
- Infection, corneal ulcer, permanent vision loss

The Cost:

- Dollars, lost time, decreased mission readiness

Wear Glasses in the Field ! Vision Ready is Mission Ready !



See story page 12

USACHPPM TODAY

**October 2002
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LET US KNOW

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We receive many calls and comments from our readers on what they read and what they would like to read. To those of you who have responded, "Thank you". Your input is important to us. To the rest of our readers, we would like to say "Let Us Know". If you have specific questions or if there are any topics you would like to see covered, send us an e-mail or write/call us.

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A MESSAGE FROM THE DEPUTY FOR TECHNICAL SERVICES

MANAGING THE CONSEQUENCES FOR DOMESTIC TERRORISM: WHERE DOES USACHPPM FIT IN?

By: Stephen L. Kistner



The threat of an intentional use or accidental release of chemical, biological, radiological, or nuclear (CBRN) materials is very real in today's world. Opposing nations and terrorist organizations are attempting to obtain CBRN weapons for the purpose of injuring or killing vast numbers of people and inflicting psychological damage on the American public. The knowledge, technology, and materials needed to build CBRN weapons are becoming more readily available. If terrorists can acquire these weapons and the means to deliver them, there is a high probability that such an attack will occur. Governor Tom Ridge even acknowledges, "It's not a question of if or when, but where." As a result of these very real threats, USA-

CHPPM felt the need to establish a policy dealing with our involvement in the emergency response to CBRN incidents. The figure below illustrates the generic phases of emergency response.

Command and control of a terrorist threat or incident is a critical function that demands a unified framework of plans and order. Presidential Decision Directive (PDD) 39 establishes policy to--

Reduce our Nation's vulnerability to terrorism, deter and respond to terrorism, and strengthen capabilities to detect, prevent, defeat, and manage the consequence of terrorist use of Weapons of Mass Destruction.

(PDD-39, U.S. Policy on Counterterrorism, 1999)

As directed in PDD-39, the Department of Defense will support the Federal response to threats or acts of terrorism by providing consultative assistance and subject matter expertise.

Timeline for Emergency Response



In responding to a terrorist incident, crisis management and consequence management are critical. Crisis management refers to the measures necessary to identify, acquire, and plan the use of resources to immediately respond to an act of terrorism. The Federal Bureau of Investigation (FBI) is the lead agency for crisis management and ensures the resources necessary to respond and resolve a terrorist threat or incident. If there is a credible terrorist threat, the FBI then notifies the Federal Emergency Management Agency (FEMA) and other Federal and state agencies involved in providing direct support to acts of terrorism. While most of the initial attention and resources has focused on crisis management, there are also important considerations that need to be addressed in the Consequence Management Phase of an emergency response. Consequence management is a multifunctional response coordinated by FEMA. It refers to the measures necessary to protect public health and safety, restore essential government services, and provide emergency relief to individuals affected by the consequences of a terrorist threat or incident. These measures will dictate when people, pets, and livestock can return safely to their homes and places of work and can resume their lives under normal living conditions.

USACHPPM's involvement in emergency response concentrates mostly on consequence management. In support to the tragedies of September 11th, we deployed a Special Medical Augmentation Response Team-Preventive Medicine (SMART-PM) to assess initial acute occupational and environmental health hazards for personnel working in the Pentagon. Our team, in coordination with other military and governmental agencies, determined the levels of hazardous contamination in and around the Pentagon; recommended mitigation of any hazards that may have posed a threat to the occupants and also to personnel conducting operations in response to the terrorist attack; and measured and assessed the health impact of a wide range of contaminants that might have been present as a result of the aircraft and building fires. We provided the expertise necessary to ensure there were no health risks to the 23,000 occupants of the Pentagon returning to their work environment.

In response to anthrax-contaminated mail received at the Hart Senate Office Building and the Brentwood Postal Facility, we deployed SMART-PMs that developed sampling protocols, processed samples, and provided

consultation on remediation techniques and evaluation of the effectiveness of such techniques. Industrial hygienists from USACHPPM-Europe have also performed industrial hygiene walkthrough surveys at postal facilities in their areas of responsibilities.

Such response capabilities are not a new phenomena. The Army has historically been a key player for any number of emergency situations dealing with natural and/or man-made disasters. When deployed to an incident scene, our functions will include technical, on-site advisory, and consultative services. We will assess (to include sampling, if necessary) health and medical threats resulting from the use of CBRN agents, infectious agents, or toxic industrial materials. Another proactive aspect of consequence management would be to assist facilities in preparation of emergency response plans, food and water vulnerability assessments, medical threat assessments, and other protocols to more adequately prepare for unforeseen horrific events.

Since the potential is much greater now for not only military facilities but also for civilian communities to experience some type of CBRN incident, organizations should develop a consequence management plan to describe their preemptive actions and planned responses. We will assist in consequence management functions by--

- Applying our technical and scientific expertise to enhance Army readiness.
- Performing risk-assessments directed towards addressing these threats in operational environments and in response to the threat use of CBRN both on Federal facilities and under the umbrella of homeland security.
- Performing rapid turn-around analysis of samples containing nuclear, radiological, or chemical materials, and establishing a partnership with laboratories certified to analyze biological samples.
- Providing vulnerability assessments to commanders of fixed installations.

-
- Coordinating and planning response efforts with other government agencies by establishing subject matter points of contact and being involved on relevant government committees.
 - Providing relevant information products such as our technical guides, technical information papers, and fact sheets.

Our personnel need to continue their mission tasks so they will be able to provide consequence management assistance by--

- Developing and providing appropriate acute and chronic chemical exposure levels to use throughout the full spectrum of military operations and for use in the civilian community.
- Providing technical input to evolving preventive medicine and CBRN policy and doctrine for current and newly identified threats.
- Providing sustainment training for military preventive medicine units through the Deployment Occupational and Environmental Health Surveillance Training Assistance Visit program and, if requested, civilian personnel, reflecting the most recent technical information and procedures.
- Developing procedures that address the warfighters' requirements to make risk-management decisions involving newly identified threats.
- Acquiring and maintaining sampling equipment, supplies and ancillary components to respond to a CBRN incident.
- Acquiring and maintaining sufficient personal protective equipment to respond to incidents safely.
- Training and sustaining our personnel to provide continuous capability to respond to CBRN incidents.

- Providing consultative services and advice regarding reentry and residual risk following a CBRN incident.
- Supporting civilian and military requests for epidemiological assistance, analytical laboratory sampling and analysis, toxicity-related assessments and other public health information in the event of a CBRN incident.
- Assisting the U.S. Army Medical Department Center and School in developing initial training on CBRN assessments.
- Organizing, equipping, and maintaining SMART-PMs.
- Establishing working agreement with accredited laboratories capable of handling and analyzing highly concentrated chemical warfare agents and biological samples.
- Providing health risk communication training and consultation support to military and civilian leaders, and medical and environmental professionals responsible for identifying risks and preventing casualties.

Our overall goal is to provide timely and effective support that addresses CBRN threats to assist in homeland security. As is the case in many public health issues, the timeliness aspect of such an effort will determine the overall success of such an endeavor. Establishing working agreements with analytical laboratories and other health-related agencies will need to be in place. The conduct of food and water vulnerability assessments or medical threat assessments will need to occur while there is sufficient time to implement resulting recommendations. Procurement and fitting of appropriate protective masks and other personal protective equipment will need to be in place prior to a terrorist incident. Often times we move these "hypothetical" questions to the back burner, while we fight today's bureaucratic dragon. For our sake and that of our countrymen, let me repeat Governor Ridge's words -- It's not a question of if or when, but where. Now is the time to act!

FIFTH ANNUAL FORCE HEALTH PROTECTION CONFERENCE

ADAPTING TO A CHANGING GLOBAL ENVIRONMENT

The Fifth Annual Force Health Protection and the Second Annual DoD Population Health and Health Promotion Conferences were held jointly 9 – 16 August 2002, at the Baltimore Convention Center, with 1550 people from all over the world attending. The theme for the joint conferences was “Adapting to a Changing Global Environment.” The USACHPPM hosted both conferences.

Highlights of the conferences were the Plenary Sessions with The Surgeons General of each Service. BG William T. Bester, Commander, USACHPPM, introduced the following VIPs: LTG James B. Peake, The Surgeon General, U.S. Army; VADM Michael L. Cowan, The Surgeon General, U.S. Navy; Lt. Gen. Paul K. Carlton, Jr., The Surgeon General, U.S. Air Force; and Dr. William Winkler, Jr, Assistant Secretary of Defense for Health Affairs. SGM David J. Vreeland, USACHPPM, introduced SMA Jack Tilley, Sergeant Major of the Army.

The conferences provided the multidisciplinary military and civilian force health protection community with the opportunity to increase knowledge and awareness of current issues, attend short courses for professional development, mentor, network, and earn CEUs or CMEs. The core conference included breakout sessions designed to provide an exchange of information with a wide application within the DOD community in the areas of homeland security, environmental health, population health, complementary and alternative medicine, behavioral health, veterinary medicine, medical research and development, injury prevention, nutrition, and spiritual health. Topics and lessons learned relating to the events of 11 September 2001 were also presented.

LTC Michael Custer, Director, said, “Hosting the conference is a service USACHPPM is proud to offer. We host it in order to bring together the foremost experts from the medical and scientific community who can share their state-of-art knowledge to foster the protection of American soldiers from the medical and environmental threats they face worldwide. The wide variety and number of presentations at this conference show how the concept of Force Health Protection has matured over the years.

Participants were invited to prepare and display technical posters that were judged for content and aesthetics. Forty-seven posters presented a wide range of force health protection and population health topics. All of the military services and many other organizations contributed to the excellent and interesting posters. A panel of peers selected the best five of the posters based on visual impact; scien-

tific merit; coherent flow; interesting content; relevance to readiness; current information; and overall impression.

Ms. Jane Gervasoni, Deputy Director, said, “We are extremely proud of the scope and the quality of our poster presenters, speakers, and our exhibitors. This conference has been a great success thanks to all of those who worked on our committee, and we look forward to hosting next year’s conference.”

The Third Annual DOD Population Health and Health Promotion Conference will be held in San Diego, CA in May 2003. The Sixth Annual Force Health Protection Conference will be held in Albuquerque, NM, 11 – 15 August 2003.

Presentations will be placed on the USACHPPM website in the near future:

<http://chppm-www.apgea.army.mil/fhp/>



Photo by: W. Ben Bunger, III

(l to r) BG Charles W. Fox, Commander, 44th Medical Brigade, Fort Bragg, NC; Lt. Gen. Paul K. Carlton, Jr., The Surgeon General of the Air Force; VADM Michael L. Cowan, The Surgeon General of the Navy; LTG James B. Peake, The Surgeon General of the Army; BG William T. Bester, Commander, USACHPPM

USACHPPM Personnel

THE ORDER OF MILITARY MEDICAL MERIT



LTC Laurie A. Cummings, USACHPPM-North, was inducted into the Order of the Military Medical Merit. The Order recognizes outstanding soldiers and civilians who make significant contributions to the Army Medical Department (AMEDD).

Cummings' contributions began from the time of her first active duty assignment. Serving as an environmental science officer in the Republic of Korea, then 2LT Cummings organized and programmed resourcing to support environmental health programs for all non-divisional Table of Organization and Equipment units. The breadth and scope of her contributions through environmental engineering and industrial hygiene consultation support to Eighth US Army and 8th Medical Command ensured that non-divisional units were able to execute required initiatives to mitigate risks associated with increased disease and non-battle injury (DNBI) rates. To quote from her first active duty OER, she is "an outstanding asset to her unit and the 8th Medical Command (Provisional)". This pattern of performance and contribution continues today.

From November 1984 to December 1987, Cummings served as the Chief of the Water, Wastewater, and Hazardous Waste Branch at the US Army Environmental Hygiene Agency, Fitzsimons AMC, CO. As the regional technical consultant for an area encompassing 23 western states and serving over 200 DA installations, the scope of her professional responsibilities was staggering. She identified and developed corrective actions to eliminate the source of chemical contamination that had plagued the Presidio of San Francisco's water supply for over 7 years. This action not only protected the health of the consumers, but saved the US Government untold expenses in remediation and litigation costs prior to turnover of the installation to the State of California. Additionally, she developed highly effective hazardous substances spill control plans for major indus-

trial facilities of the Colorado National Guard. This allowed the state to comply with all Federal laws and standards regarding environmental pollution from spills. In retrospect, the spill plans she developed have gained new relevance today with the increased threat of domestic sabotage from toxic industrial chemicals and toxic industrial materials.

After attending Pennsylvania State University and earning an MS in Environmental Engineering, she served as an Environmental Engineering Instructor at the Academy of Health Sciences. From December 1989 to June 1992, she provided instruction to over 65 separate classes in 10 different programs of instruction. In addition to the hundreds of students who directly benefited from her instruction and mentorship, she contributed to the overall benefit of the AMEDD by assisting with the development of Military Qualification Standards I and II tasks and manuals, and revision of Preventive Medicine Specialist correspondence courses. Her initiative resulted in development of an exportable basic industrial hygiene (IH) techniques training course, and the conduct of the first basic IH course in Europe. The exportable basic IH course is still being conducted in Europe today.

While serving as Commander, 48th Medical Detachment (PM), Cummings provided outstanding PM support to 15 base camps and facilities as part of the United Nations Mission in Haiti (UNMIH). Due to her technical expertise and professional diligence in providing entomological services, waste disposal consultations, epidemiological investigations, and water quality maintenance operations, the DNBI rate remained at less than 10% in the UNMIH population. Considering the environment, this accomplishment is testament to her contributions and effectiveness in the Command's force health protection efforts.

Cummings exemplifies the modern soldier/scientist, and her contributions to the AMEDD are far-reaching and innumerable. The Army recently recognized her valuable contributions and potential by centrally selecting her for battalion-level command of USACHPPM-North. On the afternoon of September 11th 2001, she lead a Special Medical Augmentation Response Team – Preventive Medicine

(SMART-PM) to the Pentagon in the wake of the terrorist attacks, ensuring the personnel in and around the structure were not exposed to adverse chemical contaminants as a result of the fires.

Cummings has built her career on selfless service and the determination to provide America's sol-

diers with world-class force health protection in any environment, and from any source, conventional or asymmetrical.

HODDINOTT BECOMES A MASTER CONSULTANT



A Master Consultant Program was established at USACHPPM in 1989. It designates those employees who have been recognized within the Army, the nation, and internationally as outstanding scientific and technical professionals. On 8 July, USACHPPM honored Keith B. Hoddinott with the designation "Master

Consultant" acknowledging that he possesses exceptional technical acumen and is recognized by his/her peers for the highest level of expertise in the areas of health promotion and preventive medicine.

Nominees must be at least a GS-12 scientist or engineer, have appropriate academic and professional credentials, be well published, and meet other specific criteria.

Hoddinott, Environmental Scientist, Directorate of Health Risk Management, is recognized for his sustained high-level contributions and personal impact in soil science. He has a M.S. – Major: Soil Science, Minor: Sanitary Engineering, Cornell University; a B.S. – Major: Plant and Soil Science, University of Connecticut; State of Maryland Nutrient Management Certificate and License; and Soil Scientist Certification, American Registry of Certified Professionals in Agronomy, Crops, and Soils.

David Daughdrill, Program Manager, Environmental Health Risk Assessment, said, "I think this recognition is one of the most important and prestigious awards that USACHPPM can give because it focuses on what makes USACHPPM great - quality

work by highly experienced people with outstanding expertise. That's exactly why Keith was selected as a Master Consultant. He has a tremendous track record of sound work and is an acknowledged expert in his field."

He serves as a technical consultant in the geology, ecology, and chemistry of soil, statistics, and risk assessments; and as a project team leader planning and executing projects of broad scope to determine the impact of military activities on human health and environmental quality. He develops and reviews standards for physical analysis of soil and risk assessment and provides guidance on these standards. He serves as an OTSG representative and liaison to national scientific and other committees and as a member of installation appointed committees dealing with technical issues of environmental and restoration for active and base closure posts and bases.

Hoddinott made significant contributions in soil science that, in many cases, have resulted in cost savings for the Government and provided economical protection of health and the environment. Especially noteworthy is his involvement with the American Society of Testing and Materials since 1981 where he has chaired a variety of subcommittees, initiated activities that expanded the scope of ASTM, and now sits on the executive committee for standards involving soil and rock. As part of this involvement, he has received various awards culminating with being named both an Honorary Member and a Societal Fellow. He said, "Since this position is usually thought of as being a part of the engineering field, this recognizes the versatility of soil science outside of its impact in agriculture."

Hoddinott and his wife, Barbara, run a small vegetable farm in Street, Maryland with Merlin, their Australian shepherd. He is active in the local Methodist church and is a part of the Silver Eagle Cloggers.

BIOMONITORING

As the United States considers military action in the Gulf, one obvious area in the lessons learned-category from the Gulf War is the criticism that insufficient exposure information was collected on deployed troops. When complaints of illness surfaced in returning troops and generated increasing concern and attention, various panels and committees examined the postulated relationships between exposure and health outcomes but concluded that insufficient data existed to evaluate these concerns systematically. Recommendations for future deployments routinely called for expanded data collection on exposures “known or anticipated” and the issue of biomonitoring was raised. Biomonitoring is the use of measurements (biomarkers) to reflect the interaction between a biological system and a potential hazard. There are many types of biological monitoring spanning the continuum from biomarkers of exposures to biomarkers of physiological effect. Biomarkers of exposure include well-known tests such as blood lead levels to assess lead exposure and carboxyhemoglobin levels to assess the degree of exposure to carbon monoxide. Biomarkers of effect include measurements of red blood cell acetyl cholinesterase levels looking for depression following exposure to nerve agents. The first two measurements have occasionally been done in deployed settings when the situation warranted; the last could certainly be considered in the appropriate settings. The three examples fall under the category of using biomonitoring when a credible threat has been recognized due to either external monitoring results or clustering of health effects

presumed related to an acute exposure.

Occupational and environmental health surveillance (OEHS) has expanded significantly since the time of the Gulf Conflict. Thousands of samples of air, water, and soil were collected in Bosnia, allowing the former Commander of USACHPPM to state that we knew more about the air, water, and soil in Bosnia than we did here at home. These samples guided recommendations about the relative acceptability of troop locations, preventive measures to consider or institute, and occasionally lead to a more focused health evaluation of troops in an area. Despite the complexities of inserting the sampling and collection processes into a deployment, it was achieved with a reasonable level of effort and did not overly tax the footprint or impact ground operations. With time, commanders are learning how to utilize the collected health risk information for operational risk management with the aid of technical guidance on the process of operational risk management for OEHS and interpretation of results. Reference values for hundreds of potential contaminants in air, water, and soil for short- and long-term exposures have been developed by USACHPPM and are currently undergoing review by the National Research Council. The current concept of OEHS utilizes intelligence preparation of the battlefield to guide location selection, sampling during base camp assessments, and intermittent area sampling to characterize the health risk posed by contaminants and operations in deployed settings. Data are archived, and attempts to link exposures to health effects occurring during deployments are

attempted when the information warrants. Explanations of OEHS findings are summarized for troops and practitioners that may conduct post deployment health assessments.

Is the current approach of anticipating health threats, assessing potential exposure levels, and evaluating the nature and degree of health complaints during deployments sufficient to meet the recommendations that followed the Gulf War? From the perspective of the troops, a recent analysis of post deployment health concerns noted that while about 4 percent cited an environmental health concern affecting their health on average during deployments in the years 1999-2000, this percentage increased significantly since the initiation of Operation Enduring Freedom (OEF). Has the threat increased or only the perception? While exposure information has been captured for many sites during OEF, the increasing number and range of deployment sites makes intermittent environmental sampling a challenge, particularly for Special Operations units. Considering that ambient environmental monitoring may be impossible or insufficient in some settings, biomonitoring may become more important. The Presidential Advisory Committee recommended “a standardized set of tests or physical examination procedures applied to a large sample of troops across all services to ensure that medical epidemiology can be conducted in the aftermath of an operation.” The Institute of Medicine recommended biological samples in addition to environmental samples. In 2002, the Government Accounting Office stated that “For major deployments and deployments in which there is an anticipated threat of chemical exposures, DoD should collect biological samples such as blood and urine from a sample of deployed forces.

Samples can be stored until needed to test for validated biomarkers for possible deployment-related exposures or analyzed in near real time as needed for high risk groups.”

Ongoing discussion topic indicates that the concept of biomonitoring in response to a clear and credible threat is generally well accepted when clear additional information can be gained. The collection of biological samples for epidemiological or archival purposes without a clear and credible defined threat has value for those who may be called upon after the fact to answer questions regarding general exposures. However, this is still viewed as unnecessary and impractical by many when no clear threat is obvious. Questions of which biological samples to take, for which analyses, and with what frequency have yet to be resolved. Logistical barriers to sample collection and transport also exist.

Ultimately, the time will come when the collection of predeployment, deployment, and post deployment biological samples are collected and stored or routinely analyzed for contaminants of concern or their metabolites and to look for phase-related shifts. Even so, this information may still prove insufficient to answer all questions regarding exposures and outcomes in deployed settings, particularly when done intermittently or one time only. It will quiet some of the criticism that DoD is not conducting comprehensive OEH surveillance during deployments. In the meantime, the practice of responding to clear threats is a practical approach that is less resource intensive. Whether it will be considered enough remains to be seen. (POC: Coleen Weese, M.D., DSN 584-2714, 410-436-2714, or 1-800-222-9698).

CONTACT LENS RELATED EYE INJURIES

A review of U.S. Army Eye Injury Reporting System (EIRS) data submitted by Optometry Clinics in the Balkans (Bosnia and Kosovo) revealed that 40 percent of all eye injuries reported during FY00 were related to contact lens wear. At Camp Bondsteel, Kosovo, 50 percent of these eye injuries were the result of soldiers wearing contact lenses too many hours (extended wear) without removal and cleaning. Additionally, 10 percent of the cases in Kosovo developed into sight threatening corneal ulcers. These injuries resulted in lost time on the job, decreased mission readiness, and the potential for permanent vision loss.

Army Regulation (AR) 40-5, Medical Services, Preventive Medicine, states that contact lens wear is prohibited during gas chamber exercises, field training, and combat. The ability to insert and remove a contact lens from the eye in a hygienic manner is greatly reduced in a dusty and dirty field environment. Diesel exhaust from vehicles and generators provides a constant source of particulate matter that can become trapped in or under the lens, causing eye irritation.

Soft contact lenses readily absorb contaminants, holding the material in the lens matrix and slowly releasing it for hours after initial exposure. This often leads to a severe ocular inflammatory reaction. Field training, deployment, and combat all require extended hours of continuous operations, causing the soldier to leave contact lenses in much longer than normal. Soldiers wearing contact lenses in the field are at increased risk for developing serious eye problems that may require immediate and emergency medical care.

The Tri-Service Vision Conservation and Readiness Program addressed this problem with a two-pronged approach: education and command emphasis. An information paper, poster,

and pocket card were developed for optometrists deployed in the Balkans to use in educating commanders and soldiers about the risks and costs of contact lens wear in the field. A memorandum of command emphasis on vision conservation and readiness was written for the Commanding General, US Army Europe/7th Army and distributed to all subordinate commanders and supervisors. This memorandum specifically addresses the contact lens related eye injury problem.

FY01 EIRS data from the Balkans was remarkable for a 16 percent reduction in contact lens related eye injuries; this program of education, command emphasis, data collection, and analysis will be ongoing. Electronic versions of the poster and pocket card have been disseminated to US Army optometrists worldwide. Plans include Army-wide distribution of these products to division surgeons for display at their medical treatment facilities and soldier readiness/pre-deployment programs.

The Field is an unfriendly environment for soldiers wearing contact lenses. The risks include a red painful eye, infection, corneal ulcer, and permanent vision loss. The costs are in dollars, lost time, and decreased mission readiness. Commanders at all levels have an obligation to protect soldiers and maximize productivity and readiness. They must ensure that their soldiers wear glasses and leave contact lenses at home during field training and deployment. Constant readiness is critical now more than ever due to increased operations tempo resulting from downsizing, ongoing peacekeeping missions, and the war on terrorism. Elimination of contact lens related eye injuries can and must be accomplished. **VISION READY IS MISSION READY!** (POC: MAJ Emery B. Fehl, DSN 584-1005, 410-436-1005, or 1-800-222-9698).

COMMUNITY RESPONSE TO GUN NOISE –THE HUMAN SUBJECTS WILL TELL THE STORY

For over 25 years, the Environmental Noise Program has been predicting community response to the noise of large guns by using an acoustic measure known as the C-weighted day-night level (CDNL). The C refers to a scale on the sound level meter that incorporates the low-frequency sound energy responsible for house vibration, and the DNL refers to a procedure for adding up the cumulative impact of multiple blasts on a logarithmic scale. In this procedure, one daytime blast at 100 decibels (dB), for example, contributes as much to the 24-hour dose as do 10 blasts at 90 dB. The procedure also requires the addition of a 10 dB nighttime penalty. This means that a 90 dB blast between 2200 and 0700 contributes as much to the 24-hour dose as the 100 dB blast during the day.

The Department of Defense (DoD) uses the CDNL because the Committee of Hearing, Bio-Acoustics, and Biomechanics (CHABA), National Academy of Sciences, recommended this measure for all kinds of military explosions. However, when CHABA made this recommendation in 1977, the primary experimental data used to justify the measure came from a 1964 experiment in which residents were surveyed after supersonic aircraft flew over their homes in Oklahoma City. From the beginning, we had misgivings. After using the CDNL for assessing U.S. Army Training and Doctrine Command (TRADOC) and U.S. Army Materiel Command (AMC) installations, our experts concluded that the measure underestimated community response to AMC demolition grounds but overestimated community response to tank and artillery ranges. In a 1979 paper given at the Acoustical Society of America, they hypothesized that very

intense blasts were more annoying and just audible blasts were less annoying than represented in the calculation of CDNL.

At that time, a research program to test this hypothesis would have been prohibitively expensive, because measurements of blast noise were made with calibrated tape recorders and/or sound level meters. In the 1990s, however, improvements in automated noise measurement equipment made such research affordable. Our first opportunity to study the question came in 1994 when Aberdeen Proving Ground (APG) asked us to instrument the homes of eight complainants who lived opposite APG on the Eastern Shore. Homes were instrumented with a vibration sensor on a window, wall and corner along with a sound level analyzer at each location. Four of the homeowners were willing and available to rate the individual blasts on a five-point scale (not annoying to extremely annoying). On average, these interviewees rated a blast at 115 decibel linear peak (dBPL) as moderately annoying. This finding was consistent with the blast noise complaint guidelines developed at the Naval Surface Weapons Laboratory, Dahlgren, VA, in 1976. According to the Navy guidelines, people are unlikely to complain if the level of a blast is below 115 dBPL. Yet, in the calculation of CDNL, the acoustic energy from blasts at levels below 115 dBPL were included as part of the 24-hour cumulative exposure. If these blasts were not annoying, they should not be included in the CDNL.

The next opportunity for investigation came in 2000 when APG provided access to 5 years of noise complaints along with 5 years of noise monitoring data from the set of 18 permanent

blast noise monitors located along the shore of the upper Chesapeake Bay. Noise complainants living within 1 kilometer of a monitor were identified, and the times of complaint were matched against the highest proximal event picked up by the noise monitor. Again, the data pointed to the utility of looking at the highest levels of blast. Most of the complaints could be linked to blast levels between 115 and 130 dBP.

Currently, we are working with the Acoustics Research team, U.S. Army Construction Engineering Laboratories, to look at the 10-dB nighttime penalty. The first engineer to apply the nighttime penalty used it to predict the annoyance of aircraft noise. When CHABA applied the same penalty to high-energy impulsive sounds, no one had data to show whether it was appropriate for gun noise. For tank and artillery training, which must take place under darkness as well as daylight, sleep disturbance is particularly critical for maintaining good relations with an installation's neighbors. Because of complaints about sleep disturbance, some installation commanders have instituted a nighttime curfew on blast noise. Using a facility provided by the Army Research Laboratory, sleeping subjects are being exposed to electronically-reproduced blast noise levels at the same level as blasts measured in neighborhoods near

Army tank gunnery ranges. To determine whether the blast levels lead to awakening, subjects are wearing motion detectors attached to their wrists. These motion detectors register whether the sleeping subjects stir after the blast. Subjects have a separate button to push if they are actually awakened.

The laboratory study is a necessary first step to any field study to determine the waking threshold for people living near firing ranges. It is well known that subjects sleeping in a laboratory are far more likely to be awakened by a noise than people hearing that noise in their own home. Thus, if blasts above 115 dBP do not wake the laboratory subjects, then there is every reason to believe that these levels would not wake people living near Army firing ranges. When coupled with a real-time blast noise monitor located in a community and feeding back information to a Range Control Office, the threshold of awakening could give an installation commander some objective data on whether to lift a nighttime curfew when a unit's training schedule is running late.

The study is scheduled for completion in 6 months. We will publish the results in a future issue of USACHPPM Today. (POC: Dr. George A. Luz, DSN 584-3829, 410-436-3829, or 1-800-222-9698).

USACHPPM Supports Army Regional Range Studies Range

USACHPPM is conducting multi-media environmental investigations of active and inactive ranges across the United States in support of the Army's Regional Range Studies Program. The Army Environmental Center (AEC) initiated the Range Studies Program to address environmental issues about range training that were raised at the Massachusetts Military Reservation. The

program's purpose is to evaluate range conditions and identify environmental factors that affect health risk to humans and the environment, allow the Army to prioritize all of its ranges for eventual evaluation, provide a preliminary assessment of drinking water resource impacts from the evaluated ranges, and provide a better understanding of Army range environmental li-

ability. The program also provides the capability to assess range sustainment needs and methods to evaluate future sustainment programs.

AEC has tasked USACHPPM to conduct a series of focused, multi media (enhanced SI level) studies of firing points and impact areas at up to 12 installations across the country. The media include soil, ground water, surface water, and vegetation. The primary interest is the environmental effects from artillery firing. Ranges from different geographical, geological, climatic settings and operational scenarios are being considered. The effort includes a screening level risk assessment of human and environmental risk and is intended to provide conservative estimates of the environmental and health impacts of range operations and identify migration pathways.

USACHPPM has assembled a matrixed, multi-disciplinary-team of ground-water, soil, sediment, surface-water, human and ecological risk assessment, analytical chemistry, quality assurance, and GIS experts to execute many of the specific range characterizations required by AEC's study. These range characterizations require teams for each of the relevant matrices to collect samples from inside of active or closed range impact areas. Included among the matrixed team are representatives of the Hazardous and Medical Waste Program, the Environmental Health Risk Program, the Ground Water and Solid Waste Program, and the Surface Water and Wastewater Program. The effort is also supported by the Strategic Initiatives Office (which provides quality assurance), the Directorate of Laboratory Services, and the Geographic Information Systems Branch of the Infrastructure

Management Division. To date, USACHPPM teams have successfully collected environmental samples at Camp Shelby, MS, Fort Bliss, TX, Ft Hood, TX, and Jefferson Proving Ground (JPG), IN.

The JPG characterization was the most recent, having been completed in October 2002. That effort included the collection of approximately 150 soil samples, fifteen monitoring well samples which included 8 new wells, 30 stream samples, 54 vegetation samples and the capture of 23 or more rodents. USACHPPM is presently planning additional range characterizations for at least two additional ranges during FY 03.

There are many expected benefits to the Army and associated public from these studies. These studies should demonstrate that in many instances, normal range training exercises do not pose a substantial environmental hazard. The studies should also demonstrate those environmental conditions that do have a higher likelihood of posing an environmental hazard. This will help to prioritize ranges for future study. It should assist with keeping Army ranges open and available for testing and training. It should protect the health of the Army personnel and associated community by demonstrating that people on and off Army installations are not drinking explosives contaminated water. It will demonstrate stewardship of training and testing ranges, and address regulatory and public issues regarding human health and the environment. (POC: Mr Barrett Borry, DSN 584-5203, commercial 410-436-5203)

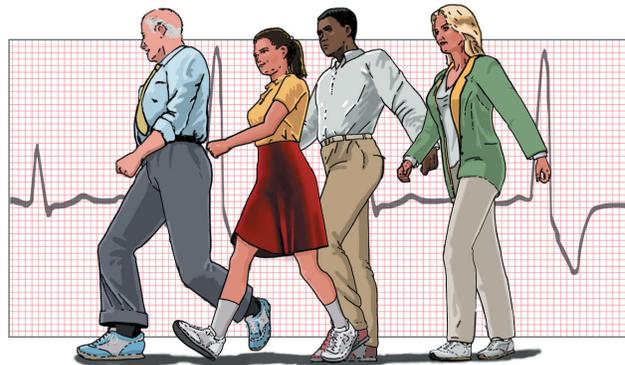
WHAT DOES WELLNESS AT THE WORKSITE LOOK LIKE?

During the last decade, wellness activities at the worksite have become an increasingly common addition to both middle and large businesses. This trend is not restricted to corporate America but can also be seen in the government workplace.

The growth of health promotion and wellness programs, which can be defined as consistent, on-going efforts to optimize individual and organizational wellness, can be attributed to several influences. Organizations, which have identified an increase in medical costs, have encouraged employees to adopt better health habits. The more health risks employees have, the greater their use of medical care, the more time lost from work, and the larger the health-related costs.

Another reason for the development of health promotion and wellness programs is the expanded American interest in achieving greater control over their health and health care. Easy access to current medical information through the Internet, managed health care that promotes cost containment, problems with physician access, increased emphasis in prevention, early detection, and self-care have all contributed to this change in attitude. This increased interest in health by employees provides an avenue for increased awareness and education of health issues and opportunities for health behavior modification through health promotion programs and events.

What are some approaches an organization can use to continue this movement towards health promotion and wellness in the workplace? Incorporating the concepts of fostering employee well being and encouraging healthy behaviors and lifestyles into the organization's mission is



the first step in health promotion taking root in the workplace. Wellness activities at the worksite should take a variety of forms and include a broad spectrum of health promotion activities. Some suggestions for ways to implement wellness are:

- On-site health fairs
- Ergonomic evaluations of employee work stations
- Organizationally sponsored recreation activities
- Civilian fitness programs sponsored by the fitness center or the medical facility
- Quarterly seminars on issues that are related to well being, such as stress management
- Wellness newsletter designed for the workplace
- Bulletin board notices that highlight monthly health observances
- Awareness posters to underscore health issues like nutrition and dietary information, men's and women's health, and responsible alcohol consumption
- Smoking cessation classes and restricting smoking to outdoor areas

-
- Low fat and healthy snack and drink choices in the vending machines

Promoting physical activity in the workplace is also a means to accomplish health promotion. Encouraging the use of stairways through easy accessibility and signs to support their use, adding shower facilities to support exercise by employees during or before the day, and installing bike racks and safe walking or bike paths at the facility are all ways to assist employees in their healthy lifestyle efforts.

The employee can also take an active part in promoting a wellness atmosphere at work. Simply taking an active role in the health promotion activities offered by your organization is an easy way to begin. Making a personal commitment to adopting healthy lifestyle habits will take you even further in this effort. If your organization is not currently active in making health promotion and wellness a priority, then your challenge is to find out what you can do to start the ball rolling. (POC: Ms. Lisa Young, DSN 584-7844, 410-436-7844, or 1-800-222-9698)

THE DREADED CHILDHOOD IMMUNIZATIONS



Didn't school just let out for the summer? It couldn't be time to get ready for the new school year already! But the summer is passing quickly and it is that time again. Time to suffer through the hunt for just the right school clothes, to pick up those school supplies, to get the sports physicals, and yes, time to make sure the kids have all their shots. From the moment the baby arrives, one of the hardest things a parent has to do is hold that little one while some "mean" nurse gives him/her a shot and makes him/her cry.

And who do they look at with tears in their eyes but you, Mom or Dad.

Sometimes it is tempting to rationalize away the need for those immunizations, but as parents, you need to be strong because the importance of childhood immunizations has not changed. Babies are born with resistance against many diseases because of the antibodies they got from their mother. That resistance does not last long, usually no more than a year, and there are some diseases, according to the Centers for Disease Control and Prevention, where the baby does not have maternal immunity such as diphtheria, whooping cough, polio, tetanus, or Haemophilus influenzae type B. If babies do not receive their immunizations, they are at risk when exposed to disease. When exposed, their body may not be strong enough to fight the disease.

Up to 60 percent of the cases of Haemophilus influenzae type B cases occur in children under the age of 12 months. Infants under the age of 6 months have the highest risk for complications from pertussis (whooping cough), with 72 percent requiring hospitalization and 84 percent resulting in death. For protection

against disease, your child should receive most of their immunizations during the first 2 years of life, starting at birth. If your child is not on the American Academy of Pediatrics' recommended schedule for vaccination, it is easy to get back on track.

But what about the stories we see on TV and the Internet about the risk related to vaccines? We are naturally worried about our children and what we put into their bodies. There are risks involved with everything we do; the question is do the risks outweigh the benefits? According to the previous U.S. Surgeon General, Dr. David Satcher, "Immunizations can be credited for saving more lives and preventing more illnesses than any medical treatment." The risks associated with childhood immunizations are normally so minor (sore arm or fever) or so rare (seizures) that they are far outweighed by the lives saved and the illness prevented.

We see what we call childhood illnesses less and less today. But the germs that cause these diseases are still out there. Until we can eliminate the disease, it is important to continue to provide protection. It is like using seatbelts in a car or having health insurance. While you are thinking of the many other things you do to protect your children, do not forget the one thing that can help to protect them from disease – vaccinations. **VACCINATE YOUR CHILDREN!**

For more information see the following web sites:

<http://www.aap.org/>

<http://www.cdc.gov/nip/publications/6mishome.htm>

<http://www.cdc.gov/nip/default.htm>

(POC: MAJ Sharon Reese, DSN 584-7151, 410-436-7151, or 1-800-222-9698)

PEDICULOSIS: A CRABBY PROBLEM

Pediculosis is commonly referred to as head, body, or pubic lice. "Cooties" refer to body lice and "crabs" refer to pubic lice. Pediculosis is an infection of the hairy parts of the body with the eggs, larvae, or adults of lice. The hair associated with the pubic region, perianal region, thighs, abdomen, and armpits are where the lice may become infested and breed.

Lice are spread person-to-person, by physical contact, with an infected individual's body or clothing, combs and brushes, or bedding. A person's first indication of an infestation is itching and scratching in the area where the lice feed. Scratching the area can increase the irritation, and if sufficiently intense, may result in a secondary bacterial infection.

It may take 2 – 3 weeks or longer for a person to notice the intense itching associated with an infestation. The involved area should be examined for eggs (nits) on the hair shafts or lice to confirm an infestation. Sometimes lice may be seen within small bluish spots on the skin, ordinarily on the trunk. A sign of infestation is a scattering of minute dark brown specks, louse excreta, on undergarments where the lice come in contact with the anogenital region.

The infected individual is able to spread pediculosis as long as lice or eggs remain alive on them or their clothing. The infected individual's family members and close social contacts should also check for infestations and seek medical treatment.

Who gets pediculosis? Anyone may become infested under suitable conditions of exposure. Head lice infestations are frequently found in school settings. Pubic lice infestations can be found among sexually active individuals. Body lice infestation can be found in people living in crowded, unsanitary conditions where clothing is infrequently changed or laundered.

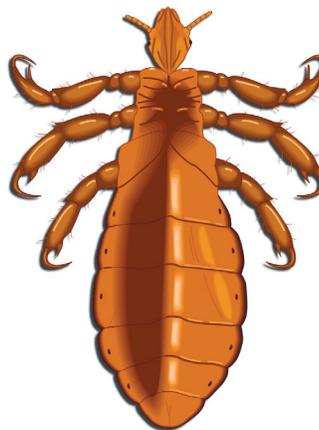
All treatment should occur concurrently to avoid re-infection. That is treating the body area at the same time as washing or dry cleaning clothes. Otherwise, clothing can cause re-infection.

Medicated shampoos or cream rinses containing lindane or pyrethrins are used to kill eggs and lice. Products containing pyrethrins are available over-the-counter. Those containing lindane are only available through a physician's prescription and are not recommended for infants, young children, and pregnant or lactating women. The dose and duration of shampoo treatment should be followed according to label instructions. Re-treatment after 7 to 10 days is recommended to assure that no eggs have survived.

Nit combs are available to mechanically remove nits and lice from hair. Shaving hair off helps removal of lice in severe cases. Cutting fingernails short and filing them smooth also helps. Patting instead of scratching itchy areas may provide relief. If you must scratch, do so with the pads of your fingers, not your nails, or use a clean, white-gloved hand to scratch. Launder clothing and bedding in hot water (140 degrees for 20 minutes) or dry-clean to destroy lice and eggs.

Preventive practices suggested are:

- Avoid physical contact with infested individuals and their belongings especially clothing, headgear, bedding, combs and brushes.
- Regularly inspect for lice: inspect hair, clothing, and bodies when indicated by frequent scratching.
- Dry clean or wash clothes in 140-degree water for 20 minutes.



HOW MUCH DO YOU KNOW ABOUT EPILEPSY?

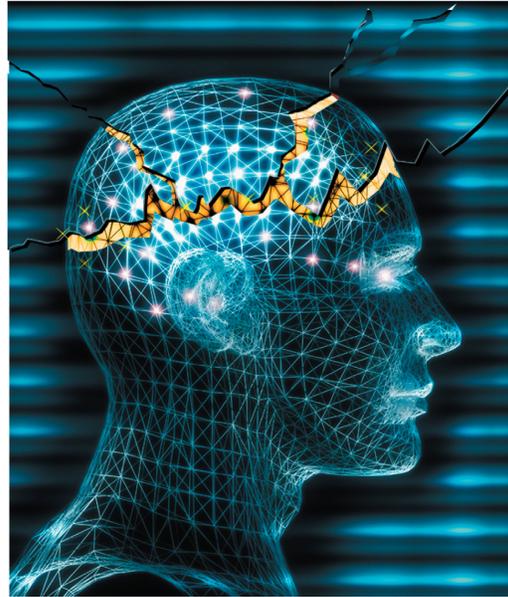
“It is doubtful if any medical condition has been so universally neglected, due to a combination of social stigma, low profile, and lack of resources.”

(World Health Organization)

What do the following people have in common: Elton John, Alexander the Great, Charles Dickens, Peter Tchaikovsky, Napoleon, Danny Glover, and Albert Einstein? They all had epilepsy! Epilepsy is a chronic medical condition, produced by temporary changes in the electrical function of the brain, causing seizures which affect awareness, movement, or sensation.

Seizures can be caused by illness, brain injury, heart problems, psychological conditions, metabolic disorders, and other phenomena that impact the brain. Finding the cause of a person’s seizures can take time and involve many tests, such as an electroencephalogram (EEG) which measures brain waves, and magnetic resonance imaging (MRI) which provides detailed pictures of activity within the brain. However, in between seizures brain cells behave normally, and it can be hard to “catch them in the act.” While about 5 percent of all people have an epileptic seizure at some point, not all develop epilepsy. Therefore, it is not unusual for a healthcare provider to recommend watchful waiting following a single seizure.

Epilepsy is a type of seizure disorder, defined as the tendency to have recurring seizures. A tendency to have seizures can run in the family, due to an inherited low threshold for seizure activity. In a person with a low threshold, brain cells act differently in situations that would not cause a seizure in someone else. For 60 percent of people with epilepsy, the cause of such unusual activity is unknown.



Epilepsy can produce many kinds of seizures, depending on the part of the brain that is affected. Also, a person with epilepsy can have more than one kind of seizure. Sometimes a person can tell if she or he is going to have a seizure, but frequently there is no warning. Common seizure types are:

☑ **Generalized seizures** involve the whole brain. The person loses consciousness and does not remember the seizure afterwards. Generalized seizures take several forms:

☑ **Tonic-clonic:** the person becomes rigid and may fall. Then, the muscles relax and tighten rhythmically, or jerk (a convulsion). The seizure may last for several minutes, leaving the person tired and confused.

☑ **Tonic:** muscles tighten without jerking. There is a risk of falling, but the seizure does not usually last long or cause tiredness and confusion.

☒ Atonic: muscles lose tone suddenly. Falling is a risk; recovery is rapid.

☒ Myoclonic: rapid jerking of one or more limbs, often right after waking from sleep. Can occur in combination with other types of generalized seizures.

☒ Absence: a temporary lapse of consciousness during which the person stares blankly and does not respond.

☑ **Partial seizures** involve only a part of the brain and do not always cause loss of consciousness. There are two types:

☒ Simple: unusual sensations or movements in a part of the body, such as strange tastes, twitching of part of a limb, and partial numbness of an area. Sometimes precede another type of seizure and are then termed “warning” seizures.

☒ Complex: a decrease in awareness accompanied by repetitive movements such as pacing, chewing, and mumbling. Person may or may not be responsive.

As indicated by the World Health Organization quote above, epilepsy carries a tremendous stigma. Not all seizures can be controlled with medication; they can be embarrassing, and people who have epilepsy frequently cannot drive a car or work full time. Men and women with uncontrollable seizures are about half as likely as healthy adults to be able to work. Only 56 percent of children with epilepsy finish high school, and only 15 percent graduate from college (comparable rates for healthy children are 82 percent and 23 percent, respectively). Many students with epilepsy report difficulty with critical thinking, memory, and concentration.

About 2.3 million Americans have seizures or epilepsy; 89,000 are children and 550,000 are over age 60. Approximately 25 percent have seizures that cannot be completely controlled by medical care. Some evidence suggests that the sooner seizure disorders are diagnosed and effective treatment started, the better the chances of a positive long-term outcome. Epilepsy frequently develops in childhood, but it can begin at any time in life.

Seizures usually occur without warning. However, some things are known to trigger them:

- Alcohol – heavy drinking
- Stress
- Patterns of light, especially flickering or rapid strobe light
- Late nights, shift work, and lack of sleep
- Illness, especially with high fever
- Hormones – seizures can be increased just before or during first days of menstruation
- Food – no evidence of particular foods acting as triggers, but skipping meals and an unbalanced diet can be triggers.

Here are some do’s and don’ts for helping a person who is having a seizure:

- DO stay calm – most seizures last only a few minutes and do not require medical attention. If a seizure lasts longer than 5 minutes or repeats within a few seconds, *seek help immediately!*
- DO ease the person to the ground if it seems he/she may fall.
- DO remove hard or sharp objects.
- DO loosen tight clothing.
- DO check for a medical ID bracelet or necklace.
- DON’T restrain the person – you may make his/her agitation worse.

- DON'T put anything in the mouth – you may injure the jaw or break teeth.
- After the seizure, DO roll the person to his/her side and assist in clearing the mouth. Stay with the person and offer reassurance.

November is National Epilepsy Month. Make a point to learn more about epilepsy and epilepsy services in your community! (POC: Ms. Judy Harris, DSN 584-7013, 410-436-7013, or 1-800-222-9698)

Additional information is available on:

<http://www.efa.org/index.cfm>

MORE COMMON THAN WE THINK - SKIN CANCER

Skin cancer is the most prevalent of all cancers with an estimated one million Americans developing skin cancer yearly. Its prevention is simple, yet difficult, for Americans to value since a bronze tan is part of our cultural vision of beauty. It is simple to prevent, however, since the best defense against skin cancer is sun avoidance.

Exposure to sunlight, including artificial tanning, is the main cause of cancer especially

when it results in burns and blistering. Additional factors that may contribute to development but are of minor consequence include: scarring from diseases and burns, occupational exposure to coal tar and arsenic, repeated medical or industrial x-ray exposure, and family history of skin cancer. Fair-skinned people are at highest risk.

The best course of action is a **NO SWEAT** approach to prevention.

N **NO** reason to stay in the sun for long periods even when protected by sunscreens. The use of sunscreen should be part of your behavior to avoid the sun, not an excuse to stay in the sun longer.

O **Old** looking before your time. Ultraviolet A or infrared sunrays still go through sunscreen and can damage the skin and the skin's immune system.

S **Seek shade.** Ultraviolet rays are most intense between 10:00 A.M. to 4:00 P.M. The best time to go out is when your shadow is taller than you are.

W **Wear** a wide-brimmed hat and light-colored, tightly woven clothes.

E **Examine your body routinely.** Routinely examine the front, sides, and back of your body; between toes and the soles of your feet; and around your neck and scalp. Use mirrors in a brightly lighted room.

Watch for precancerous skin conditions such as actinic keratoses. These are small, scaly spots most commonly found on the face, forearms, and back of the hands in fair-skinned people who have had significant sun exposure. If not treated, some actinic keratoses may become cancerous. Actinic keratosis can be removed by cryotherapy (freezing), cream or lotion chemotherapy, and laser or surgical procedure when diagnosed early.

A **Apply sunscreen** with a minimum 15 Sun Protection Factor. The higher the factor, the better.

T **Tell** your doctor about suspicious skin growths, freckles, and moles or "beauty marks" that change early rather than later.

WHAT DO I LOOK FOR? There are three forms of skin cancer: Basal Cell, Squamous Cell, and Malignant Melanoma.

Basal Cell will first appear as a small, fleshy bump most often on the head, neck, and hands, and occasionally on the trunk, as red patches. Basal cell occurs most commonly in fair people and grows slowly. Untreated, the cancer will bleed, crust over, heal, and repeat this cycle. It does not spread to other body organs.

Squamous Cell, the second most common skin cancer found in fair-skinned people, will appear as a bump or red, scaly patch. It is typically found on the rim of the ear, the face, the lips, and mouth. This cancer can develop into large tumors and will spread to other parts of the body, making early detection and treatment important.

Malignant Melanoma is the most deadly of all skin cancers, but it is almost always curable when detected in the early stages. Anyone may develop this form of skin cancer. It is **not** predominantly found in fair-skinned people. Warning signs of melanoma include changes in the surface of a mole; scaliness, oozing, bleeding, or the appearance of a new bump; a spread of pigment from the border of a mole or bump into surrounding skin; and change in sensation such as itchiness, tenderness, or pain.

Melanomas are asymmetrical, and their borders are ragged, notched or blurred; pigmentation is not uniform (shades of tan, brown, black with dashes of red white, and blue give a mottled appearance), and their width is greater than six millimeters or the size of a pencil eraser.

Skin cancers are treated surgically.

Further information about prevention and treatment of skin cancer is available online from the National Cancer Institute at www.cancer.gov or by phone at 1-800-422-6237/1-800-4-CANCER, www.hooah4health.com/4you, www.cancer.org/main, www.wellnessbooks.com/skincancer, www.drkoop.com/conditions/ency/index, and <http://www.fda.gov/> (POC: Colonel Frances J. Sorge, DSN 584-2303, 410-436-2303, or 1-800-222-9698)



ACID GAS ANALYZER--SMALLER, LIGHTER, MORE PORTABLE

The field soldier can be exposed to many different toxic gases including acid gases. The acid gases typically come from the use of some types of fire suppression systems and the firing of weapons systems, which use perchlorate-based solid rocket propellant such as the STINGER, Avenger, and the Multiple Launch Rocket System (MLRS). In order to measure soldier exposure levels to these acid gases, USACHPPM has developed acid gas analyzers that measure gases such as hydrogen fluoride, hydrogen chloride, and hydrogen cyanide in real time. These analyzers are suitcase size and fairly portable; however, for some testing situations they are too big to be placed inside of an armored vehicle. Ammo boxes usually fit very easily inside the armored vehicles; therefore, we decided to reduce the size of the acid gas analyzer to fit inside of a 100-round 50-cal. ammo box.

For the first reduction in size we eliminated some of the onboard fluids. The three 4-oz. bottles of water containing different concentrations of fluoride calibration standards were completely eliminated. Two 1-liter bottles are normally used in the full size analyzer, one for a vacuum trap and one to contain a pH-buffered trapping solution. Reducing the onboard vacuum trap and buffered trapping solution by one-half enabled us to close the lid on the ammo box. However, the reduction in trapping solution resulted in a run time that was cut in half, just over 2 hours. Most tests last for 30 minutes to 1 hour, so the reduced run time does not pose a serious problem.

To improve the portability of the gas analyzer we had to get rid of the 110 VAC power requirement. Since the fluid pump in the analyzer runs on 12 VDC, we were able to replace the transformer and associated electronics with a small 12 V battery.

A battery operated 6-volt personal air-sampling pump easily takes the place of a 110 VAC air pump to move sample air through the gas analyzer. This pump readily fits inside the ammo box. A voltage divider attached to the 12 V battery supplies power for the air pump, thus eliminating the weight and volume required by a separate air pump battery.

A potentiometric electrode detects the acid gas of interest. The electrode generates a voltage in proportion to the concentration of the acid gas it is measuring (similar to measuring pH). For example, there is a 59-mV change in output from the electrode for every ten-fold change in hydrogen fluoride gas concentration. This voltage response from the analyzer is currently stored on a data logger about the size of a cigarette lighter. The logger neatly fits inside the ammo box and can store 18 hours of data.

The chemistry components and the electronics are small enough to fit on a 4" x 6" board. On one side are mounted the fluoride electrode, a reference electrode, and a solenoid pump for moving solution through the analyzer. On the other side the electronic control board, signal conditioner, and data logger are mounted. To protect these components from blast overpressure this mounting board is sandwiched in foam during testing and can be removed easily for servicing.

As with any instrument, temperature changes can affect the results. In the suitcase analyzer a thermostatically controlled heater provided a uniform temperature inside the instrument. This was a rather large and heavy addition to the original gas analyzer. When downsizing the gas analyzer, we changed our philosophy from controlling the temperature inside the analyzer to monitoring and compensating for the temperature. To do this we developed a flow-through temperature sensor that

enables us to electronically record temperature with time. Knowing the temperature when the acid gas samples are taken allows for appropriate adjustments in our measurements. Replacing the heaters used in suitcase analyzer with the flow-through temperature sensor in the downsized analyzer resulted in a significant reduction in weight and volume.

The overall size reduction of the gas analyzer is 73% going from 1.1 cu. ft. to 0.3 cu. ft. The weight reduction is 42% going from 25 lbs. to 14.5 lbs.

Where to from here? Since the analyzer is totally portable, with minor modifications a direct readout in parts per million of acid gas concentration is feasible. This capability would assist industrial hygiene personnel to survey the air quality surrounding a fire test, or even conduct a hazard assessment at accidental releases such as when a tanker carrying acid overturns on the interstate.

When making any scientific measurement, it is important to have four critical pieces of data: what is present; how much; time and date of the

measurement; and where the measurement was taken. The electrodes tell us what is present (which acid gas in this case) and how much is there. The data logger has a time and date stamp to tell us when the measurement was taken. By adding a global positioning system to the analyzer we can determine where the measurement was taken. Therefore, we would have all four critical elements of information. Given the small size and weight of this analyzer, we can make measurements at places that were not possible before. For example, it is possible to attach the analyzer to a balloon and have it float through a plume of gas from an open burning or open detonation associated with a demilitarization operation. The real-time data collected would be valuable for validating the computer modeling of the plume.

The new packaging of the acid gas analyzer, along with its portability and simple operation, make it an attractive alternative for measuring acid gas concentrations both for the military and private sector. (POC: Mr. Steve Hoke, DSN 584-2269, 410-436-2269, or 1-800-222-9698)

BEHIND THE SCENES OF GAS CHROMATOGRAPHY/MASS SPECTROMETRY

One of the most requested analytical techniques is gas chromatography/mass spectrometry (GC/MS). GC/MS is used to identify and quantify a long list of volatile organic compounds (VOC) and semivolatile organic compounds (SVOC) in air, soil, and water. GC/MS methods are often required when fuel, solvent, or other industrial chemical contamination is suspected, so it is easy to see why these methods are popular. A variety of U.S. Environmental Protection Agency (EPA) methods are performed by the GC/MS Team to include SW-846 8260 (VOC)

and 8270 (SVOC) for Resource Conservation and Recovery Act work; EPA 524 (VOC) and 525 (SVOC) for drinking waters; and TO-1 (VOC) and TO-13 (SVOC/Polynuclear Aromatic Hydrocarbons) for air samples.

A GC/MS analysis can be viewed as a two-part process - separation and identification. During the separation, the mixture of analytes is introduced into the gas chromatograph. The analytes are immediately heated to put them into the gas phase, then flow into a column. The analytes adsorb onto the material inside the column

for different amounts of time. All target compounds eventually pass through the column, but they exit the column separated into individual components if the system is working properly. The separation step is complete! The second step is identification/quantification of the analytes. As the name (MS) suggests, the analytes are identified by their mass, actually a collection of masses specific to each compound that results when the compound enters the mass spectrometer. The analytes are quantified by comparison of the compound's mass spectrum to calibration spectra.

The analysis can be explained relatively easily. However, there is a lot of behind-the-scenes work that must be done before and during the GC/MS analysis. This work adds labor and cost to the analysis, but is method mandated and serves to insure data quality.

For most procedures, a significant amount of time must be devoted to preparing the sample. Simply put, this involves getting any sample contaminants of interest from the sample into the GC/MS system. Water cannot be injected into a GC/MS system. The same obviously goes for a soil. In addition, to achieve desired detection limits, the sample often must be concentrated to get as much of any present contaminant as possible into the analytical system. For SVOC analysis, all samples (soil, water, or air that has been collected on a solid media) must be extracted with organic solvent and the solvent concentrated to a small volume. The solvent can then be injected into the GC/MS. For VOC analysis, the water sample or soil sample that has been placed into a solution is purged with a gas stream. The purge forces the volatile contaminants from the solution and onto a trap. When the purge is completed, the trap is heated, releasing the contaminants into the GC/MS system.

Preparing the GC/MS system for analysis of the samples is often a time consuming and

complex process requiring significant expertise. If the GC/MS system is not well maintained, clean, and free of leaks, the chances of meeting the quality assurance and quality control (QA/QC) requirements and producing a quality data package are slim. If the previous batch of samples were dirty, analysts perform full maintenance of the GC injection system and column before starting on a new set of samples because it is unlikely the system will meet performance criteria due to the problems left by the previous set of samples. Residue in the injection system left by dirty samples provides sites where compounds in performance check samples, standards, and samples can react. The result is often that an unacceptable amount of a compound of interest makes it through the system and to the detector (low recovery). Hence, the next project cannot yet be analyzed. Cleaning/maintaining the system can be a daily task on some instruments. Maintenance of the system may include cooling the injection port, removing the column from the port, cutting off a portion of the column that is no longer effective, replacing the injection liner, gold seal, washer, and septum. More time consuming maintenance procedures such as MS source cleaning is sometimes necessary. Once the system is cleaned, the MS must be tuned, any leaks must be identified and repaired, and calibration must be checked or performed. It is not unusual for one or more analysts to spend a full day or more preparing the GC/MS for the next project. Clearly, the analysis process starts well before the samples are actually injected into the system.

For all methods, much effort is put into the strict QA/QC requirements. QA/QC is incorporated through the entire procedure and must be met to insure the acquired data are accurate and defensible.

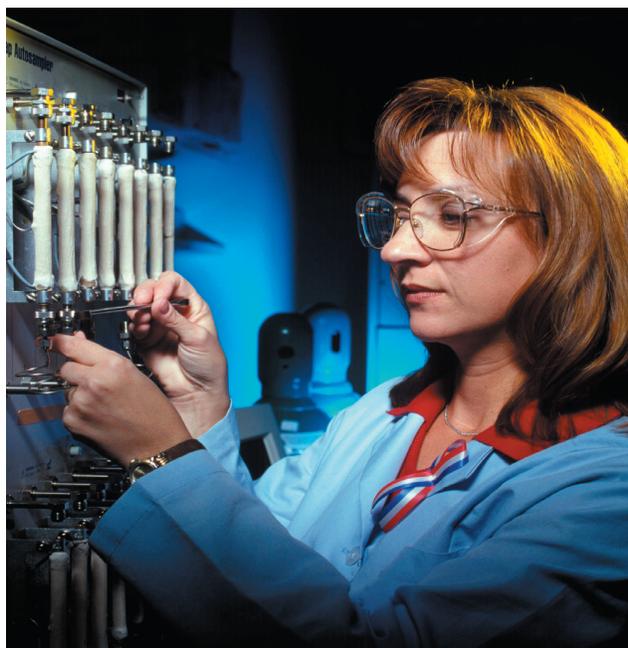
To illustrate an overall GC/MS process for the sample itself, let's examine the (SVOC) analysis of a soil by SW-846 method 8270. First, the sample must be prepared for analysis (by SW-846 method 3545 or 3550). After mixing the soil with a drying agent, the soil is extracted with methylene chloride by ultrasonic disruption or by accelerated solvent extraction, a relatively new technique that saves time and uses less solvent. After extraction, the solvent fractions that now contain the organic compounds originally in the soil are passed through a drying column to remove water, then heated over a water bath to concentrate the sample to 1 milliliter (mL). The final extract is put into a sample vial and taken to the GC/MS lab for analysis. When the sample reaches the analysis lab, the samples are loaded into the autosampler and analyzed after the maintenance discussed above has been performed and the instrument is properly calibrated and tuned.

After the data are collected, the analyst reviews the data to insure the instrument software has properly identified all of the present com-

pounds, then loads/enters all of the sample information and data into report forms. This process, which requires patience and great attention to detail, results in production of the report package. The analyst passes the assembled package to a primary technical reviewer who reviews the data to insure data quality objectives and other quality control requirements have been met, and that any data qualifications are explained in the report narrative. The report is then passed to a second reviewer who makes certain all elements of the report are included and the report is customer-ready.

The GC/MS Team analyzes approximately 1,500 samples per year, producing roughly 100,000 individual results. The team currently has 11 members who share the responsibilities for sample preparation, analysis, data review, instrument maintenance and repair, and workload management. The experience, expertise, and dedication of all the members leads to the production of quality GC/MS data reports delivered to the customer in a timely manner.

(POC: Dr. Charles E. Stoner, Jr., DSN 584-7162, or 1-800-222-9698).



GC/MS Team member, Jennifer Seeger, analyzes air samples for VOC.

DOHS

DEFENSE OCCUPATIONAL AND ENVIRONMENTAL HEALTH READINESS SYSTEM (DOEHRS)

The Defense Occupational and Environmental Health Readiness System (DOEHRS) is an automated information system designed to support the Hearing Conservation (HC), Industrial Hygiene (IH), and Environmental Health (EH) missions within the Military Health System (MHS). DOEHRS provides timely and efficient access of data and information to users throughout the DoD worldwide.

In October 2001, the DOEHRS Project Management Office (PMO), which provides acquisition and life-cycle management to DOEHRS, moved from USACHPPM to the Clinical Information Technology Program Office (CITPO) in Falls Church, Virginia. The DOEHRS Technical Integration Office (TIO) is now located at USACHPPM-Main. The DOEHRS TIO is a development, testing, and integration facility operated under the government oversight of Ms. Brenda Wolbert. An integrated product team in the TIO consists of system engineers, security personnel, database administrators, and web developers. The DOEHRS TIO provides DoD oversight to all technical operations for the MHS-funded DOEHRS project.

The Hearing Conservation Component of the DOEHRS system (DOEHRS-HC) is fully deployed throughout the DoD. The most recent version, DOEHRS-HC 3.0, was deployed in July 2002 with substantial performance improvements. The DOEHRS TIO, working in close concert with the Functional DOEHRS-HC Project Manager, Ms. Leeann Domanico, and the Tri-Service users, were key in ensuring that DOEHRS-3.0 was a quality product to support this DoD medical surveillance mission.

The DOEHRS Data Repository (DR) is an Oracle data warehouse designed to store information from the DOEHRS-HC and the DOEHRS-IH systems. The DOEHRS-DR design, based on Oracle Warehouse Methodology, consists of different schemas

used for the Staging Area and the Operational Data Store in support of the DoD Hearing Conservation and DoD Occupational Health Programs. A major objective of the DOEHRS-DR is to enable enterprise data sharing by offering a reliable cross-departmental view of hearing test and exposure related data.

The DOEHRS-DR went into production for the DOEHRS hearing conservation users in June 2001. User-defined reports, that span the gamut from installation-level to DoD enterprise-level, are produced through a Web-based front-end application. The DOEHRS-DR also allows for ad hoc and multidimensional reports to support senior leader decision-making and research. Beginning in October 2002, local users will have the capability to view data that has been exported to the DOEHRS-DR to address local queries. These reports will be designed by the Tri-Service Hearing Conservation functional representatives to meet local user ad hoc query requirements. Future enhancements to the DOEHRS-DR include additional standardized reports, a DOEHRS-IH business area, and automated error reporting.

The DOEHRS-IH is the component of the DOEHRS system that will meet the force health protection mission needs supporting the Tri-Service IH and EH communities. DOEHRS-IH will deploy a web-based capability that ties into the DOEHRS-DR to allow similar reporting capability that is now available to support the HC mission.

POC for the DOEHRS Project is MAJ Steve Spellman, DOEHRS PM, email to Steve.Spellman@tma.osd.mil.

POC for the DOEHRS-DR is Ms. Brenda Wolbert, DOEHRS-TIO Manager, email to Brenda.Wolbert@apg.amedd.army.mil

USACHPPM-South

West Nile Virus – Where Do We Go From Here?

Since its 1999 introduction in New York City, the West Nile virus moved steadily through New England and the Mid-Atlantic States, and by 2001, reached the Mississippi River and the upper Midwest. In 2002, we observed its seemingly relentless march from the Mississippi River west to California and north into Canada.

As of September 20, the Centers for Disease Control and Prevention have verified 1745 human cases of WN virus with 84 deaths. Virus activity has been detected in 42 of 50 states. West Nile has remained in the headlines and raised many concerns with the average citizen. CHPPM, through its Internet presence, plays an important role as a trusted source of information on current disease threats. A visitor to our website has quick and easy access to all the most accurate and up-to-date information available.

Mosquito-borne diseases are endemic in the U.S. and if WN is indicative of the future, we can look forward to the emergence of additional diseases. For this reason, it is extremely important that CHPPM maintain its excellent mosquito surveillance program. A well-run surveillance program is essential to detect viruses as soon as they appear and to provide timely information on virus transmission to individuals at the local level. Since 2000, CHPPM-North has served as the primary Department of Defense West Nile mosquito-testing center. Their efficient testing system and dedication to timely reporting have ensured that vital information is funneled directly to the installation where it can be used to effectively target mosquito control operations.

Personal protection measures are still the best defense against infection with mosquito-borne diseases. CHPPM has historically taken the lead in promoting the DOD Insect Repellent System. Proper wear of the Permethrin-treated uniform combined with DEET applied to exposed skin constitutes the first line of defense against vector-borne disease. Surprisingly, many soldiers in the field do not utilize the tools provided to protect them. As health educators as well as force protectors, we should be emphasizing the DOD Insect Repellent System during our technical assistance visits with active and reserve component Preventive Medicine personnel.

CHPPM has proven itself to be an invaluable asset to the DOD in the fight against vector-borne diseases. Because of this success, we have an excellent opportunity to expand our services. Through equipment acquisitions and advances in technology, it will soon be possible to conduct surveillance not only for West Nile virus, but also for all vector-borne disease pathogens likely to be encountered in CONUS. CHPPM and its subordinate commands are well situated to take advantage of this opportunity to provide the DOD with another tool to support environmental health surveillance and force health protection.

POC: LTC Scott W. Gordon, Commander
CHPPM-South.

USACHPPM-Pacific

Change of Command for CHPPM-Pacific



COL Joan P. Eitzen passed command responsibility for CHPPM-Pacific to COL Ross D. LeClaire on July 30. The ceremony was held at Camp Zama, Japan and featured the U.S. Army Japan Band.

BG William T. Bester, Commander, CHPPM, hosted the ceremony.

He thanked Eitzen for her leadership and competence. Eitzen has been the commander since August 2000. She also served as Director, Health Promotion and Wellness, at CHPPM and the Consultant to the Army Surgeon General and the Army Nurse Corps for Health Promotion and Wellness. She graduated from the U.S. Army War College in 2000 with a Master's Degree in Strategic Studies.

LeClaire comes to CHPPM from the U.S. Army Medical Research and Materiel Command. He has served as a Staff Officer, Medical Biological Defense Research Area Directorate; Medical Product Manager, Medical Materiel Development Activity; and Veterinary Comparative Medical Officer, Department and Division Chief, Medical Research Institute of Infectious Diseases, Fort Detrick, Maryland. He has conducted research resulting in peer-reviewed publications in molecular immunology; plant, marine, algae,

and bacterial toxins; and bioaerosol pathogenesis. During this time, he facilitated transition of vaccines for botulinum neurotoxins and staphylococcal enterotoxins into advanced product development. He represented the command in the area of biologics development and manufacture compliance for Anthrax Vaccine Adsorbed and Pentavalent Botulinum Toxoid Vaccine. On behalf of the Nunn-Lugar Cooperative Threat Reduction Program, he served as team leader for Project Discovery assignments to the Independent States of the Former Soviet Union. In addition, he served on NATO working groups and biomedical technical panels to study defense aspects of aerosol threat agents, and authored/co-authored NATO long-term scientific studies.

LeClaire's awards include the Meritorious Service Medal (three oak leaf clusters), Army Commendation Medal (two oak leaf clusters), Army Achievement Medal (one Oak Leaf Cluster), Air Force Achievement Medal, and the National Defense Service Medal (one bronze service star). He is a member of the Order of Military Medical Merit and Society of Phi Zeta (Honor Society of Veterinary Medicine). He also holds The Surgeon General's "A" proficiency designator (veterinary comparative medicine).

LeClaire is married to the former Janice Marie LaHaye of Minneapolis, Minnesota. They have three children: Tara, Ryan and Dana.

THE NEW TAML “LITE”

In 1995, the Theater Army Medical Laboratory was developed to provide confirmation level chemical, biological and environmental laboratory analysis in austere environments under tactical conditions. To this day there is no deployable unit within the Department of Defense that can provide the technical capability that this unique organization can bring to the theater operation.

While the complexity and the level of analytical capability are impressive this comes with a price. The TAML was setup to operate out of expandable ISO shelters and sections of Temper tent. To maintain proper ambient temperatures for the various chemical assays the shelters and tents are all connected to environmental control units. These requirements fit into a relatively large footprint and require trucks and material handling equipment for deployment and redeployment.

This is not a unique problem to today's Army combat units. Analogous to the armored mechanized units moving from a 70-ton track vehicle to a lighter more sustainable tank, the TAML needs to seek ways to deploy a much lighter analytical package. The challenge is not only to design a lighter deployable package but at the same time continue to provide the same level of conformational analytical capability.

To this end, a team of TAML soldiers has been working in collaboration with the SBCCOM team of contractors that design and build the Biological Identification and Detection System. The BIDS units consist of a lightweight shelter mounted on the back of a HUMMV. The shelter is equipped with various pieces of analytical equipment designed to detect and provide a preliminary screen assay for biological warfare agents. Under current doctrine, a Technical Escort Unit would then transport a “presumptive” positive screen test to a confirmation laboratory.

Using the skills and fabrication equipment supplied by the SBCCOM contractors an older model BIDS shelter was stripped of the BIDS equipment mounting hardware by the TAML team. The team then worked closely with the technical advisors from both the chemical and biological warfare assessment teams within the

TAML to modify the shelter to accept the various pieces of analytical equipment required by the TAML to confirm chemical and biological agents.

The salient piece of equipment used for chemical warfare agent analysis is the gas chromatography mass spectrometer (GC/MS). This highly sophisticated and sensitive analyzer posed a number of unique and challenging problems to the team. After considerable planning and extremely helpful consultation assistance from the SBCCOM contractors, the TAML soldiers fabricated a custom, shock-mounted system to hold the GC/MS and the various support hardware needed during specimen analysis.

During the TAML's recent field training exercises the shelter was mounted on a HUMMV and deployed to the training site. Preliminary results were very encouraging. The GC/MS performed all the specimen training samples providing equivalent results to the GC/MS operating from the expandable ISO shelter. Additional local deployment tests are planned to assure the system is robust and not adversely affected by road conditions and frequent moves. Subsequently the shelter will be fitted with a fume hood capable of handling dangerous chemical and biological samples.

If this project proves to be successful this will result in a highly mobile confirmation chemical and biological laboratory that will result in almost an 80 percent reduction in weight over the traditionally deployable package. While the lighter concept will not have the redundant capability of the current laboratory and will not be capable of analyzing a large number of samples, it will meet current restrictions on military air cargo frame space and deployments to less than mature logistical base structures. For the TAML to remain relevant to the current OPTEMP, efforts will have to be made to provide its unique analytical capabilities in a deployment package that is responsive, deployable, agile, versatile, survivable and sustainable.

POC: COL Ron Shippee, Commander, Theater Army Medical Laboratory.



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