Outlook

Naval Medical Research and Development Command

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Inside this Issue

NMRDC Sailor of the Year

DT2 Eskinder Dagnachew

CAPT J. C. Cecil, III, NMRDC Executive Officer, presents DT2 Eskinder Dagnachew with the NMRDC Sailor of the Year Award during a ceremony at Headquarters.

Since arriving at the Naval Dental Research Institute Detachment, Bethesda, MD, DT2 Dagnachew has been assigned as the Research Assistant in a long-term, quantitative fluoride release project. He is the only dental technician in the Navy that has been trained to operate state-of-the-art and technique-sensitive histologic processing equipment for use in the hard-tissue processing laboratory and he performs many unique and critical functions for the Dental and Orthopedic Departments of National Naval Medical Center.

"I enjoy the camaraderie in the Dental Research Department and the research community," Dagnachew said. "In research, we are always at the forefront of trying to improve techniques and materials so health care providers are equipped with the best technology which results in the improvement of care for our patients."

DT2 Dagnachew was instrumental in the reorganization and renovation of administrative and laboratory spaces for the arrival of a new National Institute of Dental Research, National Institutes of Health branch and a newly established Department of Defense Epidemiology Team for the study of tri-service dental treatment needs.

His work led to his selection as the Senior Sailor of the Quarter at the National Naval Dental Center,

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HMCM Kelly M. Pedersen, NMRDC Command Master Chief, Retires

Master Chief Hospital Corpsman Kelly M. Pedersen, USN, the Command Master Chief of NMRDC since October 1990, commenced his Terminal Leave in February, and will transfer to the Fleet Reserve on 30 April 1994.

Master Chief Pedersen, a native of Lancaster, CA, enlisted in the Navy in January 1966.

Following his training as an Advanced Laboratory Technician, his subsequent assignments were: Naval Hospital San Diego, Naval Hospital Long Beach, Naval Hospital Taipei, Naval Hospital Naples, the Armed Forces Institute of Pathology, USS HOLLAND (AS-32), National Naval Medical Center, Naval Medical Command European Region, and finally Naval Medical Research and Development Command.

Master Chief Pedersen and his wife Marianne will continue to reside in Germantown, MD.

CAPT E. T. Flynn , NMRDC Commanding Officer, presents HMCM Kelly M. Pedersen, NMRDC Command Master Chief, with a parting gift during the retirement luncheon.

The new Command Master Chief is Master Chief Hospital Corpsman Cecil McWilliams, who will report in March 1994 from Naval Medical Center, Portsmouth, VA.

Sailor of the Year cont. from pg. 1

Bethesda, MD and the Sailor of the Year of the Naval Medical Research and Development Command. "I feel it is a great honor being selected from among some of the best sailors within the Command," Dagnachew said.

Born in Harrar, Ethiopia, DT2 Dagnachew moved with his family to Clark Mills, NY in 1970. He joined the Navy in 1985. "I joined the Navy for adventure and new challenges," Dagnachew said. His adventure started with boot camp and the Naval Dental School of Assisting and Technology in San Diego, CA in 1985. The Navy has taken him to Parris Island, SC; Fleet Marine Force Training, Camp Johnson, NC; and the 22D Dental Company, 2D Dental Battalion, Camp Lejeune, NC, where he served with distinction in Operation Desert Shield/Desert Storm and Operation Easter Exit.

While at Camp Lejeune, he completed an Associates of Arts degree from the University of South Carolina. In Bethseda, he completed a Bachelor of Science degree in Health Care Management from Southern Illinois University . What are his plans for the future? Dagnachew said, "I am currently enrolling in a masters program at Troy State and I will be applying to become a Medical Service Corps Officer".

NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND

Commanding Officer
E.T. Flynn, CAPT, MC, USN
301-295-0287

Executive Officer
J.C. Cecil III, CAPT, DC, USN
301-295-1825

Director of Research and Development
R.C. Carter, CAPT, MSC, USN
301-295-0883

Associate Director for Research Management
C.S. Eisemann
301-295-0882

Research Area Managers (RAMS)

Submarine and Diving Medicine
L. Fenton, LCDR, MC, USN
301-295-0879

Aviation Medicine and Human Performance
T. J. Singer, CDR, MSC, USN
301-295-0878

Combat Casualty Care
P.D. Kent, CDR, MC, USN
301-295-0880

Fleet Occupational Health
P. Knechtges, LCDR, MSC, USN
301-295-0885

Infectious Diseases
C.J. Schlagel, CDR, MSC, USN
301-295-0881

Dental Research
J.C. Cecil III, CAPT, DC, USN
301-295-1825

Bone Marrow Registry
R. Hartzman, CAPT, MC, USN
301-295-1837

Intellectual Property Counsel
A. David Spevack
301-295-6759

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VIEW FROM THE TOWER

by CAPT E. T. Flynn, MC, USN, NMRDC Commanding Officer

As I write this column, the Naval Medical Research and Development Command is once again entering a round of discussions on how to consolidate medical assets across the DoD. This year's effort is being driven by the Assistant Secretary of Defense for Health Affairs as a part of DoD's FY95 Base Realignment and Closure process. Further Project Reliance collocations and the creation of a Defense Medical Research Agency are both under consideration.

Downsizing and Consolidation

We can expect downsizing and consolidation to be a way of life for us for the next several years. It is a process involving players at all levels in the organization. With so many inputs and so many differing agendas, the ultimate outcome of this process is far from certain. We are continuing to proceed on our own internal NMRDC laboratory consolidation plan as outlined in the last edition of *Outlook*. I believe that this plan is still the best course to be on, given all the variables. The most important thing is to prepare for change and not become discouraged as the rules of engagement appear to change from week to week without apparent reason.

Retirement

This is my last column for *Outlook*. In June, CAPT Thomas N. Jones, MSC, USN will assume command of NMRDC. A veteran of the R&D arena, Tom is a superb Naval officer with the vision and determination to lead us through these turbulent times. Please give him your wholehearted support.

I leave the Command with both a sense of sadness and a sense of pride: sadness to leave so many dedicated, selfless individuals who have made this Command one of the finest medical research organizations in the world; pride in the fact that we have been able to achieve so much in the past three years despite formidable obstacles.

Our Successes

A number of successes over the past three years come to mind.

- First is the budget which has increased from $85 million to slightly over $120 million. Not all of this increase has been Congressional largesse. Successful marketing efforts have increased our funding in many different sectors of the budget. Our programs are valued very highly in the Pentagon.
- Our technology transfer program is booming. With 29 Cooperative Research and Development Agreements in place and a growing list of licensing agreements, we are the Navy's leader in this area.
- Human use has come into the national spotlight in a big way. The painful realignment of our human use program a year ago has paid dividends not only in affording greater protection to our research volunteers but also in allowing us to reassure our critics that we meet the highest moral and ethical standards in the conduct of human research.
- We have been successful in instituting multi-year funding of work units and developing a system of proposal writing and incremental reporting that more closely aligns the in-house and extramural contract program. When coupled with external peer review, we now have a mechanism that clearly demonstrates the highly competitive quality of our in-house programs.
- We have been able to use the newly strengthened Armed Services Biomedical Research Evaluation and Management Committee with great effectiveness to resolve interservice issues and preserve the Navy's interests in the larger DoD medical research arena. Long standing disagreements with the Army, particularly in the area of infectious disease research, now seem to be a thing of the past.
- Finally, after more than three years of difficult and often contentious deliberations, we have hammered out a Strategic Plan that is our blueprint for the future. The plan emphasizes the development of a clear investment strategy, insistence on high quality programs, aggressive marketing, consolidation of resources into a more efficient organization, open communication, and, above all else, valuing our people as our most precious asset. This plan will serve us well.

As I leave the Navy, I reflect on the tremendous contributions the medical research community has made to preserving the health, well-being, and war-fighting capability of our sailors and Marines.

It is a legacy we can all be proud of!

NAVY /ARMY DENTAL RESEARCH CONSOLIDATION MOVES CLOSER

by CAPT Stephen A. Ralls, DC, USN, Commanding Officer, Naval Dental Research Institute

Project Reliance/BRAC 91 mandated the collocation of Army and Navy dental research at Great Lakes, IL. After numerous delays and obstacles, collocation of the two dental research programs now has a firm timetable. Construction to rehabilitate spaces at the Naval Dental Research Institute (NDRI) is scheduled to begin in February 1995 with full occupancy by the Army in August 1996. We expect the first of the Army personnel to be ordered to Great Lakes within the next 6 months.

On 1 December 1993, a meeting was held at the Pentagon with Dr. Joseph Osterman; RADM Ronald Morse, Chief of the Navy Dental Corps; MGEN Thomas Tempel, Chief of the Army Dental Corps and Deputy Surgeon General (acting); Commanding Officer, Naval Dental Research Institute; COL Michael Rethman, Commander of the U.S. Army Dental Research Detachment at the Walter Reed Army Institute of Research; CAPT Michael Parsons, NMRDC U.S. Army Program Liaison; and other senior officers. Both Army and Navy representatives quickly agreed conceptually to a consolidated dental research program.

As requested by Dr. Osterman, a direct outcome of this meeting was a letter signed by MG R.T. Travis and RADM W.A. Buckendorf which initiated the first formal move toward consolidation and outlined necessary steps. One of the first steps was to schedule a ground-up rebuild of the Army and Navy dental research programs, similar to that done with the infectious disease program. The rebuild for dental research is planned for 19 April 1994. Various service representatives, scientists, dentists, NIH experts, and others will evaluate and grade dental research on different criteria. The rebuild will establish research priorities while shaping the direction of a consolidated laboratory.

The dental research programs of both services are comparatively small. In an environment of increasing demand for decreasing resources, it is imperative that efficiency be improved if the program is to survive. Consolidation of the two programs would comply with the law and preserve mission capabilities.

Among other benefits, consolidation would (1) streamline command and control; (2) reduce costs by sharing and leveraging resources; (3) preserve a world-class technology base; (4) provide more diversified services to customers; (5) improve inter-service cooperation and communication; (6) enhance the reliance of one service on another for technology development; (7) provide better return on investment through sharing and increased efficiency; and (8) provide a bi-service research environment which will promote recruitment, retention, and career progression of quality personnel.

The term bi-service is used as the Air Force does not have a formal dental research program; their participation would be welcomed in the future.

This will be the first conversion of two existing research laboratories to a single consolidated laboratory. There are many factors yet to be determined. What is the planned parent organization of the consolidated laboratory? Department of Defense? Lead Agency? How does consolidation, driven by BRAC 91 mandate, ultimately influence the proposed plan for reorganization of the Naval Medical Research and Development Command?

Regardless of the final shape, Navy dental research hopes to maintain a long and mutually beneficial relationship with Navy medical research.

DENTAL RESEARCH IS IMPORTANT TO THE NAVY

Dental problems significantly impair operational readiness and sustainability. Navy and Marine Corps personnel can find themselves in operational settings with no immediate access to dental care, let alone specialty care, and where dental problems could jeopardize a multi-million dollar mission.

Nearly one in five MEDEVACs in Vietnam was for dental reasons. In Desert Shield/Storm there were 18,885 dental patient visits, and 30% were for dental emergencies (5,678).

These military-uhique situations require dental research to characterize patient populations, identify better diagnostic and risk assessment techniques and methods of prevention and treatment, improve the health care delivery system, and address short-fuse research-related issues.

The civilian sector has shown no interest in investigating problems such as dental emergencies in operational environments, Phased Dentistry (a unique management care system for Navy dentistry adopted by BUMED), dental sealants on recruits, third molar emergencies, risk assessment by corpsmen, systematic evaluation of disease progression prior to treatment, wellness, and quality of life.

Navy dental research is the best, by far the most responsive, and most cost-efficient way to conduct this important research. Navy dental research has historically been a highly productive area of biomedical research.

U.S. NAVAL MEDICAL RESEARCH UNIT NO. 2 DETACHMENT CLOSES IN JUNE 94

by CDR John G. Perrault Jr., MSC, USN, Officer-in-Charge, U.S. Naval Medical Research Unit No. 2 Detachment

The Manila detachment of NAMRU-2 will close in June 1994 after 15 years in the Philippines. Closure of the Manila detachment was made necessary by the loss of 14 officer and 18 enlisted billets from NMRDC's FY94 authorized end-strength.

Although officially established in Manila on 15 April 1979 when it relocated from Taipei, Taiwan, NAMRU-2 has long been active in research collaborations in the Philippines. NAMRU-2's earliest work in the Philippines was an investigation of a reported increase in Entamoeba histolytica infections at Naval Air Station Cubi Point in 1959.

In September 1961, an epidemic of cholera in Manila brought NAMRU-2 back to the Philippines to begin what would become a long and fruitful association with the Philippine Department of Health and the staff of San Lazaro Hospital in Manila. Working with their Filipino colleagues, NAMRU-2 scientists modified and improved upon the Navy-developed method of treating cholera by accurate assessment of lost body fluids and replacement with appropriate intravenous fluids. As a result, the case fatality rate from cholera fell from 40% to 2% within a week of implementing this method. Later, the oral treatment of cholera, developed in Bangladesh by a former NAMRU-2 commanding officer, received its first evaluation by NAMRU-2 investigators at San Lazaro Hospital and soon came into widespread use throughout the Philippines and the developing world.

In 1966, NAMRU-2's investigation of an epidemic of dengue hemorrhagic fever in the Manila area elucidated the pathophysiology of the disease. Again in 1967, NAMRU-2 assisted the Philippine Department of Health in the investigation of a new "mystery disease" in Northern Luzon which affected several hundred people, many of whom died. During three years of continuous work, NAMRU-2 epidemiologists and parasitologists identified the new parasite as Capillaria philippinensis, demonstrated its unique life cycle, determined its mode of transmission and evaluated drugs for its treatment.

From 1968 until it relocated to the Philippines in 1979, NAMRU-2 maintained a laboratory at the San Lazaro Hospital. During these years, numerous projects were conducted in the Philippines, including surveillance for scrub typhus, dengue fever, influenza, amebiasis, leptospirosis and schistosomiasis, as well as studies on the etiology of encephalitis, jaundice, meningitis and diarrhea. Biomedical surveys also were conducted throughout the Philippines to establish baseline data on a wide variety of parasitic, bacterial and viral diseases and their vectors.

In April 1979, NAMRU-2 was provided additional laboratory space at San Lazaro Hospital and the Bureau of Research and Laboratories in Manila, and the command and administrative offices were relocated in Makati. In May 1987, renovation of the present spaces in Pavilion 7 were completed, consolidating the command and administrative offices in the San Lazaro compound where they would be close to the research staff. During the 1980s, other buildings were built or renovated to provide laboratory space and research support including a medical library, oral rehydration facility, entomology building, animal house and garage/ warehouse. A satellite laboratory was built in Palawan to study malaria and laboratory spaces at the Angeles City and Olongapo Social Hygiene Clinics were renovated for use in HIV surveillance.

Throughout the 1980s, research grew apace with the growth in facilities. Previous research initiatives such as intestinal capillariasis, schistosomiasis, leptospirosis and others continued while new research interests emerged. Malaria, particularly the clinical presentation, immunology, drug sensitivity and cultivation of Plasmodium falciparum, became a major area of research. Important work was done on the epidemiology and clinical manifestations of dengue fever, chikungunya and Japanese encephalitis in both indigenous Filipinos and U.S. personnel stationed in the Philippines. The vectors of these arboviruses, as well as the vectors of malaria in the Philippines, were the subject of extensive research, often in collaboration with the U.S. bases at Clark and Subic Bay. Other work performed during this period included studies of filariasis, diarrheal agents, typhoid fever, acute hepatitis, sexually transmitted diseases, cobra bites and Ebola virus infection in Philippine monkeys.

In 1985 a longitudinal study of HIV seroincidence and a companion natural history study were begun in the cities adjacent to the U.S. bases and extended to include all regions of the Philippines. In mid-1989, serious threats from communist insurgent elements forced the relocation of U.S. personnel from the San Lazaro Hospital compound to a U.S. Embassy building in Makati. For their security, U.S. personnel could visit their laboratories sporadically. Consequently, the decision was made to relocate the command to Jakarta, Indonesia where a detachment had been in operation since 1970. By October 1990, the only remaining funded

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CAPT JERRY C. PATEE AND LCDR DANIEL L. DOLGIN APPOINTED NMRDC TECHNOLOGY TRANSFER COORDINATORS

NMRDC has made significant progress in the area of technology transfer through Cooperative Research and Development Agreements (CRADAs) with universities and private industries. These agreements recognize the dual use of NMRDC research and turn Navy-generated results into commercially usable products and processes.

To consolidate existing technology transfer efforts within the NMRDC laboratory system and to promote new CRADAs, CAPT E. T. Flynn, NMRDC Commanding Officer, appointed CAPT Jerry C. Patee, MSC, USN and LCDR Daniel L. Dolgin, MSC, USN as NMRDC's technology transfer coordinators.

CAPT Patee is the Executive Officer at the Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, FL. CAPT Patee helped to initiate and execute a model technology transfer program that received national recognition. Under his direction NAMRL's first CRADA was successfully negotiated with a major commercial airline and additional CRADAs are under negotiation with all NAMRL's research areas. CAPT Patee is a charter member of the Gulf Coast Alliance for Technology Transfer (GCATT) and a member of the Federal Laboratory Consortium (FLC) Committee. In a formal ceremony in Raleigh-Durham, NC, CAPT Patee was awarded the 1993 FLC Southeast Region Outstanding Service Award for Excellence. He is personally committed to developing a better awareness of technology transfer within the NMRDC laboratory system by sharing NAMRL's success stories in the area of technology transfer with the other NMRDC laboratories.

LCDR Dolgin is a representative of the Office of Research and Technology Applications (ORTA) and the FLC at the Naval Biodynamics Laboratory (NBDL), New Orleans, LA. LCDR Dolgin has many years of experience representing Navy technology for tri-service planning efforts, including work with other government agencies and private corporations. His proactive approach to managing the technology transfer program first at NAMRL and then at NBDL has resulted in several significant accomplishments. These include a CRADA with a commercial airline concerning pilot selection, nationwide advertising of laboratory technologies and capabilities, and participation in the planning efforts resulting in the establishment of and NAMRL's partnership in GCATT. As a technology transfer advocate, LCDR Dolgin has written several articles describing the development of the model technology transfer program at NAMRL.

The current national policy on the transfer of federally developed or owned technologies to the commercial marketplace is based on Presidential Executive Orders and existing laws defining the role of federal agencies in technology transfer.

In past years, private corporations were reluctant to conduct joint research with federal agencies because of concerns that competitors could gain access to proprietary information through Freedom of Information Act (FOIA) requests. Another reason private corporations were unwilling to invest in cooperative research focused on government co-owned research results that would be available to competitors.

Since the introduction of the Stevenson-Wydler Act of 1980 and passage of the Federal Technology Transfer Act in 1986, these concerns have been put to rest. The Federal Technology Transfer Act explicitly protects proprietary information provided by a cooperative research and development partner from FOIA requests. The statute allows federal laboratories to grant exclusive licenses to cooperative research partners for the intellectual property developed during a given project.

In today's environment, business and federal laboratory survival demands that organizations continuously improve their products and fine-tune their processes. In such an environment, NMRDC's services and facilities can provide other federal organizations and private corporations with the critical competitive edge needed for success in the marketplace.

The first task of the new Technology Transfer Coordinators is the FLC National Technology Transfer Meeting scheduled for October 1994 CAPT Patee and LCDR Dolgin will prepare an exhibit that spotlights projects and technologies from all the NMRDC laboratories.

NAMRU-2 MANILA DET

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work unit in Manila was HIV infection in militarily-relevant geographic areas. On 15 March 1991, the command was officially established at Jakarta and the Manila laboratory was downgraded to a detachment.

Since March 1991, work has continued on the epidemiology and natural history of HIV infection in the Philippines. Additional minor collaborative projects on Ebola virus infection in monkeys and on hepatitis were also undertaken. In June 1993, NMRDC reluctantly decided to close the Manila detachment in order to preserve viable scientific programs at NAMRU-2 Jakarta. During the final year, the Manila detachment has accelerated the pace of its research to complete an epidemiological study of HIV in the metropolitan Manila area by April 1994 so that final execution of its closure can commence.

UPDATE: The Armed Services Biomedical Research Evaluation and Management Committee

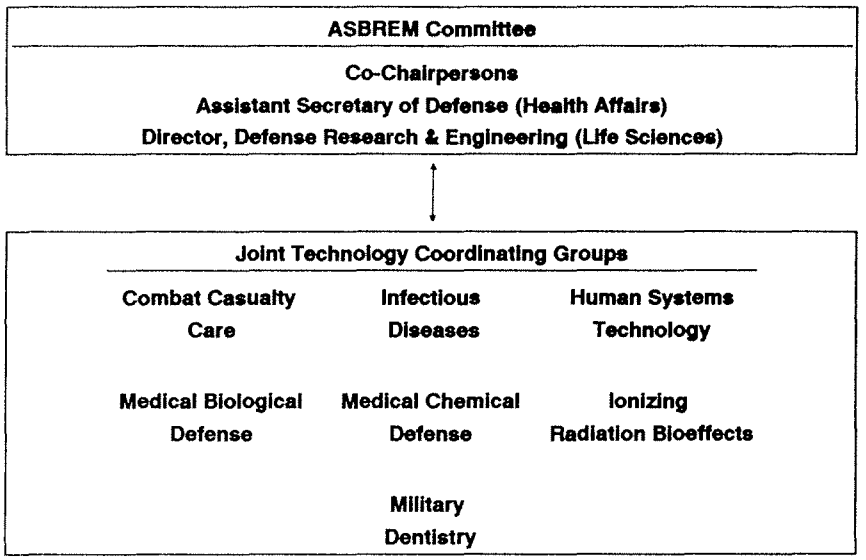
by CAPT W. M. Parsons, MSC, USN, Navy ASBREM Secretariat Representative

The Armed Services Biomedical Research Evaluation and Management Committee (ASBREM) is a Congressionally sanctioned body responsible for coordinating biomedical research within the services. The committee is a mechanism to integrate the services' medical research efforts, avoid duplication of research efforts, ensure relevance and cost-effectiveness, and maintain responsiveness to service requirements.

The full ASBREM Committee includes the uniformed flag research and development representative from each service; the Assistant Secretary of Defense for Health Affairs; and the Director, Defense Research and Engineering (DDRE)(Life Sciences). The latter two function as the co-chairpersons of the Committee. Seven Joint Technology Coordinating Groups (JTCGs) - Military Dentistry, Infectious Diseases, Medical Chemical Defense, Medical Biological Defense, Human Systems Technology, Combat Casualty Care and Ionizing Radiation Bioeffects - provide the organizational mechanisms to execute the ASBREM functions (*OUTLOOK* , August 1992). The full ASBREM Committee meets on a quarterly basis, with the agenda developed by the ASBREM Executive Secretary and appointed service representatives to the ASBREM Secretariat.

The latest ASBREM meeting occurred on 15 February 1994. Agenda items addressed were primarily of an informational and status report nature and included the Defense Women's Health Initiative; the Desert Storm Illness; issues concerning the status of AFRRI, USUHS and the Henry M. Jackson Foundation; and the involvement of the Advanced Projects Research Agency (ARPA, formerly DARPA) in the ASBREM process in biomedical research areas.

ASBREM Structure



Agenda Items

- In view of the planned assignment of women to naval combatants as early as March 1994, the Navy has a strong interest in the Defense Women's Health Initiative. Research proposals have been submitted to the coordinating committees and are under review.
- Desert Storm Illness has been a topic of intense media interest. Investigation into the etiology of the spectrum of symptoms continues. The Naval Health Research Center, San Diego, CA has submitted a proposal for a comprehensive epidemiological study which is currently under review.
- The issues of AFRRI, USUHS and the Jackson Foundation are all related through the Reinventing Government initiative and Congressional and DoD program budget decisions. DDRE has requested that the Navy consider assuming ownership of AFRRI should USUHS be disestablished. All three services have emphasized and supported the need to retain the Jackson Foundation. ARPA is increasingly becoming more and more involved in biomedical research. The Navy raised this as an issue with the ASBREM with the result that ARPA will be requested to provide a representative to the ASBREM and to applicable JTCGs.
- Since the 15 February 1994 meeting, DDRE has directed that the ASBREM play a pivotal role in the Base Realignment and Closure process for FY95 as it effects biomedical research laboratories. This will ensure that the highest priority medical research programs are preserved and funded in a cost-effective manner.
- There is no question that significant facility and program realignments across the services will be considered and that the image of medical research and development as we know it today will be greatly altered.

The Navy will play a key role in this deliberation process.

Tri-Service Toxicology at Wright-Patterson AFB,Ohio

by Lana Martin, NMRITOXDET Technical Editor

With the advent of Project Reliance and the Base Realignment and Closure Act, the occupational and environmental toxicology components of the Navy, Air Force and Army have merged into Tri-Service Toxicology.

Tri-Service Toxicology

Tri-Service Toxicology is the functional integration of three previously separate military toxicology efforts. Under Project Reliance, the Naval Medical Research Institute Toxicology Detachment, the Toxicology Division of the Air Force Armstrong Laboratory, and the Occupational Health Branch of the U.S. Army Biomedical Research and Development Laboratory were collocated at Wright-Patterson AFB.

The mission of Tri-Service Toxicology is to provide timely solutions to current and anticipated problems through an integrated approach to research. The goals of the tri-service research team are to cultivate a better partnership with material developers, to improve weapons systems performance, to control life cycle costs, to improve human safety and to preserve the environment for future generations.

Tri-Service Toxicology is an integral asset within DoD as the center of excellence for toxicology research. Through the development and use of advanced research methods, studies are conducted for the operational, environmental and occupational arenas. Tri-Service Toxicology has many customers within DoD, including material developers, operational commands, health and hygiene agencies and military Surgeons General. Standard toxicity tests, performance decrement test batteries, physiologically-based pharmacokinetics modeling, in vitro screens, and mechanistic studies are used to evaluate potential hazards posed by new chemicals and materials in mission-relevant exposure situations.

Historical Perspective

Concerns regarding the toxic effects of chemicals became significant during World War I when Germany launched the first chemical warfare attack against Allied troops. Gas poisoning resulted in 100,000 fatalities and over one million casualties. The development and use of chemical warfare agents since that time has resulted in the need of the U.S. military for toxicology data to assess the physiology and pathology of chemical warfare agents and the development of therapeutic measures.

During this same period, the growth in the U.S. chemical and automotive industries created new chemicals and occupational hygiene needs that would impact the health and safety of military personnel.

Toxicology programs in all three services were established to address the results of these historic events.

Navy Toxicology

By the 1950s, the growth in the U.S. chemical industry, the development of more complex weapon systems, and the potential of mission degradation resulting from health hazards generated the need for a Navy toxicology program. Fleet personnel were continuously exposed to chemical substances used aboard Navy submarines and ships, including fuels, fuel additives, propellants, hydraulic fluids and lubricants. Many toxicological questions were raised concerning man/machine interface problems involved with nuclear submarine habitability.

The Navy Toxicology Unit (NTU) was established in 1958 at the National Naval Medical Center in Bethesda, MD. NTU established many military-unique toxicological study practices that are still used today, such as continuous exposure studies and the 90-day study practice. Toxicology's "boom years" (1960s - 1970s) found NTU's Bethesda location too restrictive. This tremendous growth included orientation toward mechanistic toxicology and the need for quantitative toxicology to reduce uncertainty in species-to-species extrapolation. In the mid-1970s, NTU was disestablished, and the personnel and resources were reassigned as the Toxicology Division of the Environmental Bioscience Department of the Naval Medical Research Institute (NMRI). In 1976, it was determined that the Navy's toxicology division and the Air Force's toxicology program (The Aerospace Medical Research Laboratory at Wright-Patterson AFB) would mutually benefit from collocation and cross-utilization of resources and personnel. Thus NMRI created the NMRI Toxicology Detachment at Wright-Patterson AFB. This relationship has proven successful and established the foundation for Tri-Service Toxicology.

Air Force Toxicology

The Air Force's toxicology program began in 1956. Research toxicologist Dr. Anthony A. Thomas began studying the occupational toxicology of missile propellants and oxidizers. He and his staff of four were assigned space in the basement of the Wright-Patterson AFB Area B hospital dispensary. In 1959, the laboratory became the Aerospace Medical Laboratory and the focal point of the Air Force initiative "Man in Space". This initiative required establishing limits for continuous human exposure in space travel.

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Tri-Service Toxicology continued from page 8

Dr. Thomas moved the program into Area B's Building 79 and designed an inhalation toxicology program to build a continuous exposure data bank. Four inhalation toxicology chambers, the Thomas Domes (*Outlook* December 1992), were designed with hypobaric, continuous exposure capabilities. Four additional chambers were constructed in 1964. For twenty years, these domes were the foundation of inhalation exposure studies on the toxicity of a number of atmospheric contaminants.

In 1965, the Toxic Hazards Division of the 6570th Aerospace Medical Research Laboratory (AMRL) was created. This division was faced with many military-relevant questions of toxicity – data were needed to establish exposure limits for chemicals in the work place; issues arose concerning human health hazards associated with exposures of carcinogenic potential; and data were needed for water quality test batteries. In 1976, the NMRI Toxicology Detachment was created at Wright-Patterson AFB to collaborate with the Toxic Hazards Division. AMRL received Air Force-wide laboratory status and evolved into Armstrong Laboratory Occupational and Environmental Health Directorate/Toxicology Division in 1991. The Occupational Health Branch of U.S. Army Biomedical Research and Developmental Laboratory (U.S. ABRDL) joined the toxicological research team at Wright-Patterson AFB in the early 1990s.

Army Toxicology

The U.S. began studying chemical warfare agents upon entering WWI in 1917. These studies were directed by the medical and pharmacology/toxicology sections of the U.S. Army Chemical Warfare Service. The Chemical Warfare Service had both medical and research sections from WWI until 1979, when the Biomedical Laboratory of the U.S. Army Chemical Systems Laboratory, Edgewood Area of Aberdeen Proving Ground (APG), MD was transferred to the U.S. Army Surgeon General. This relocation provided significant differentiation between the antidotal/therapeutic and the defensive aspect of chemical warfare research. Two laboratories resulted: 1) the Toxicology Division of the U.S. Army Chemical Research, Development and Engineering Center, APG, MD, and 2) the U.S. Army Medical Research Institute of Chemical Defense, APG, MD.

WWI established the importance of industrial hygiene, and the U.S Army responded by establishing the U.S. Army Industrial Hygiene Laboratory at Johns Hopkins University, Baltimore, MD, in 1942. This laboratory, later named the U.S. Army Environmental Hygiene Agency, played a major role in significantly reducing the number of occupational disease-related fatalities in WWII. In 1944, the Toxicology Branch was established in the office of the Army Surgeon General. U.S. ABRDL was established in 1972 and relocated at Fort Detrick, MD in 1974. Today, the Occupational Health Branch of U.S. ABRDL is collocated at Wright-Patterson AFB with the Navy and Air Force's toxicology programs, and represents the U.S. Army in Tri-Service Toxicology.

NMRDC'S FLEET OCCUPATIONAL HEALTH RESEARCH PROGRAM AND NAVY TOXICOLOGY STUDIES

In certain operational environments sailors and Marines are at risk of exposure to chemical and biological hazards that may threaten their health and degrade operational performance. New knowledge and techniques for understanding the hazards associated with unique Naval environments are being developed in order to reduce or prevent injury, improve safety, and optimize mission effectiveness.

The Fleet Occupational Health Research Area is one of seven NMRDC managed research programs. LCDR P. Knechtges, MSC, USN is the research area manager who is the central contact point between the laboratories, where the research takes place, and headquarters, where budget decisions are made and research planning and execution policy is established. LCDR Knechtges manages intramural and extramural research activities which includes several toxicology studies. The in-house research efforts are complemented by a contract and grant program with universities and private industry. In addition to core funded research programs, the toxicology program includes reimbursable funded work for routine toxicity testing of Navy materials.

Research efforts in toxicology focus on Navy-specific substances and exposure situations. The resulting research data are used to develop models predicting human exposure consequences in actual use situations, to tailor exposure limits during exposure conditions and to recommend medical surveillance and treatment guidelines.

This research program, like all NMRDC research programs, focuses on operational medicine. Unlike traditional medical care provided at military and civilian hospitals and clinics, operational medicine specifically focuses on the readiness and care of sailors and Marines who train and work in an operational setting or a deployable status. It includes issues such as physical readiness, human performance, safety, and shipboard or field medicine. Emphasis is placed on disease and injury prevention and casualty care.

LESSONS LEARNED FROM NOIC

by Kip Johnson, NMRDC Special Asst. for Occupational Safety and Health/ NMRI Safety Manager

During the week of 24 - 28 January 1994, the Naval Medical Research Institute (NMRI), Bethesda, MD was host to the Inspector General's Navy Oversite Inspection Unit (NOIC) which conducted a Navy Occupational Safety and Health Inspection. There were many lessons learned.

New Programs Areas

The new OPNAV Safety Instruction 5100.23C contains five new programs. Although most of these new program areas do not appear to be applicable to Navy Medical R&D facilities, safety officers are expected to address the programs appropriately. The following new programs were inspected:

1. Energy Control Program

This program requires safety officers to identify all pieces of equipment which are **hard-wired** directly to an energy control panel and to identify all personnel who operate this equipment (pieces of equipment that have a cord which plugs directly into an electrical socket are exempt). At NMRI, it was noted that a few metal working machines and autoclaves met this **hard-wired** definition. When this equipment is being serviced, it is required to be physically locked-out at the energy source (circuit breaker or switch). If lock-out is not possible, a tag must be placed on the piece of equipment to alert personnel not to operate it. Personnel must be trained in the requirements of this program which are explained further in Chapter 24 of OPNAVINST 5100.23C.

2. Ergonomics Program

Occupational illnesses, particularly in the form of carpal tunnel disease, are seeing a great increase in the Federal workplace. An effective ergonomic program is seen as a means of addressing current problems and preventing future cumulative trauma disorders (CTDs). Safety officers are required to review mishaps for the last five years and determine if there is a need to implement an ergonomics program. NMRI had one CTD case and justified the decision not to have a formal program. NMRI did document many back injuries and will continue to promote a formal back safety/safe lifting program.

3. Confined Space Program

Most activities have crawl spaces, manholes, tunnels or voids located somewhere on the complex. Although personnel are not assigned to these unventilated "dungeons," access to these spaces may be required at some time. The quality of the air in these spaces is often suspect, will not support life and must be checked by a certified engineer. Safety Officers must identify and restrict access. NMRI designated the Confined Space Program Manager at the host command (National Naval Medical Center) as the individual who will issue permits for entrance to these confined spaces. The personnel who will be accessing the confined spaces must be trained in the requirements. More specifics are discussed in Chapter 27 of OPNAV 5100.23C.

4. Exposure to Lead Program

This program addresses personnel exposed to inorganic lead products. Most activities will identify possible exposure to lead via soldering and handling lead bricks for shielding radioisotopes. This exposure is well below the permitted exposure limits as determined by the industrial hygiene surveys; however, personnel who use solder or lead bricks must be aware of possible overexposure and trained in methods to avoid overexposure. This can be accomplished by distributing to all personnel a copy of Appendix A of the OSHA lead standard, 29 CFR 1910.1025. (The use of appliances that contain lead batteries is not considered lead exposure.)

5. Formaldehyde Program

Formaldehyde is used at nearly all of NMRDC's laboratories. The permissible exposure limit is extremely low (0.75 PPM). Any laboratory with personnel who are exposed to formaldehyde in a concentration above 1% is required to have a formal formaldehyde program. The requirements include the identification of workspaces, proper labeling, baseline personnel exposure surveillance, engineering methods to reduce exposures, issuing of formaldehyde resistant PPE and training. The OSHA standard 1910.1048 explains more.

Comments on Current Programs

Inspection of Work Spaces

Safety officers must ensure that a frequency of inspection statement is included in local safety instructions. Include in the statement the fact that there are no high hazard areas. For example: "All workspaces will be inspected at least annually. There currently are no areas at NMRI designated as highly hazardous. Should areas, processes or pieces of equipment be designated as a high hazard in the future, these areas will be inspected quarterly."

Overhead Deluge Showers

The inspectors pointed out a major construction discrepancy in most overhead emergency showers at NMRI. ANSI 348.1 requires that showers will operate freely without an operator having to keep pressure down on the activation chain or lever (This is to allow a person to undress while remaining deluged with water). Although NMRI showers carry a manufacturer claim meeting ANSI standards, the flow control valves permit water to flow only when the chain is pulled and held down. NMRI is requesting a retrofit valve from the manufacturer to change this situation.

UPDATE: U.S. Naval Medical Research Unit No. 2, Jakarta, Indonesia

by CAPT F. Stephen Wignall, MC, USN, Commanding Officer, NAMRU-2

West Kalimantan (Borneo), Indonesia - A Major Focus of Hepatitis E Identified by NAMRU-2

The epidemic nature of hepatitis E (HEV) is a phenomenon well recognized throughout Asia. First identified in India during the 1956 outbreak involving 29,000 cases, enteric related non-A, non-B hepatitis has since been detected in epidemic form from the neighboring countries of Nepal, Pakistan and Myanmar, as a single source water-borne agent with the potential to impact significant numbers of people at one time.

In Indonesia, HEV was the causative agent in an outbreak reported from West Kalimantan during October/November 1987. The virus was implicated as the responsible agent in approximately 2500 cases on the basis of 28 (out of 34) jaundiced patients who tested negative for both IgM anti-HAV and IgM anti-Hbc.

A follow-up investigation was carried out through a collaborative effort in September 1993 to describe the epidemiology of a 1991 outbreak and determine the persistence of IgG antibody response two years following the epidemic. Cases (79) identified from IgG HEV positives surveyed in 1991 were age/sex/community matched with controls (69) who had no reported history of jaundice and/or hepatitis.

Preliminary findings indicate that West Kalimantan, Indonesia, is a likely focus for endemic HEV transmission. The high prevalence of HEV among study controls (61%) suggests many epidemic related infections to be inapparent in nature. Study results also provide the strongest evidence to date about the persistence of HEV IgG antibody response (2 years) resulting from an outbreak involving a significant proportion of the population.

Malaria Treatment Studies

Resistance to Chloroquine by Plasmodium Vivax

Resistance to chloroquine by Plasmodium vivax seems to be an emerging problem in Southeast Asia. Evidence of resistance has been largely restricted to case reports, primarily non-immune travellers returning to nonendemic areas. However, population-based studies in the Arso region of Irian Jaya revealed an astonishingly high frequency of resistance to chloroquine by P. vivax; the 28 day cumulative incidence of post-therapeutic recurrent parasitemia was 80%.

These studies employed non-immune transmigrants from Java as representative of deployed troops, and the data provide an estimate of the degree of risk of encountering resistance to chloroquine in P. vivax from the New Guinea region.

Studies are currently underway to determine the frequency of chloroquine resistant P. vivax at other sites along the 3,500 mile Indonesian archipelago.

Primaquine for Casual Prophylaxis Against Hyperendemic Malaria

NAMRU-2 completed a 19 week trial of primaquine for casual prophylaxis against the hyperendemic multi-drug resistant malaria of the Arso region of Irian Jaya, Indonesia.

The approximately 100 study subjects were transmigrants from Java recruited into the study on the day of their arrival. Like deployed troops, transmigrants lack any acquired immunity at this stage. The subjects received either primaquine (30 mg base every other day, adult dose) or standard chloroquine prophylaxis. The minimal efficacy of primaquine was 75% for P. falciparum and 90% for P. vivax. Tolerance of primaquine was superior to that of chloroquine. To confirm these findings, a second study was designed and carried out.

Awards presented at
U.S. Naval Medical Research Unit No. 2 Jakarta, Indonesia
and
U.S. Naval Medical Research Unit No. 2 Detachment
Manila, Republic of the Philippines

Name	Award	From
CDR George Orndorff	Navy Commendation	COMNAVAIRPAC
LCDR Andrew Corwin	Navy Commendation	CHBUMED
	Navy Achievement (2nd)	CO, NAMRU-2
HM1 Agustin Figer	Navy Commendation	CHBUMED
LCDR Emily Richie	Navy Achievement	CO, NAMRU-2
LT Steven Brown	Navy Achievement	CO, NAMRU-2
HMC Materno Aninzo	Navy Achievement (2nd)	CO, NAMRU-2
HM2 Mark Greenwood	Navy Achievement (2nd)	CO, NAMRU-2

UPDATE: U.S. Naval Medical Research Unit No. 3, Cairo, Egypt

by CAPT Richard G. Hibbs, MC, USN, Commanding Officer, NAMRU-3

Extended Immunogenicity Trial

NAMRU-3 and the University of Alexandria Enterics Field Site have started an extended immunogenicity trial with 120 Egyptian adults and children using the killed whole cell oral cholera plus B subunit vaccine, under the direction of LCDR David Tribble, MC, USN. NAMRU-3 researchers also have started collaborative epidemiologic research with 700 soldiers of the Multinational Forces and Observers in the Sinai Peninsula to evaluate infectious disease risks specifically directed at rickettsial, leishmanial and arboviral pathogens. Troops include members of American, Fijian and Columbian units.

Clinical Tropical Medicine Program

NAMRU-3 just completed a highly successful six-week training program in Clinical Tropical Medicine for three infectious disease fellows, including two civilians and one active duty Navy officer. The program, organized by LCDR Tribble, Dr. Nabil Ayad, Dr. Nabil Iskander and the staff of the Clinical Investigation Department, involved daily tropical medicine lectures by NAMRU-3 staff and visiting professors, daily clinical rounds, and hands-on research experience in retrospective chart review projects. Over 500 records from patients with the Fever of Unknown Origin Syndrome, and 300 records from typhoid fever patients were reviewed and analyzed, and results are being prepared for publication. This program was very well received and will be repeated on a regular basis, to attract and train other infectious disease fellows who may have research interests in common with U.S. Navy needs. Steps will soon be initiated to develop this into a formal tropical medicine training course.

Noninvasive Surveillance for Rift Valley Fever Infection

A NAMRU-3 team lead by CAPT Robert Esquire, DC, USN, conducted surveillance for Rift Valley Fever (RVF) infection among U.S. troops participating in the recent Operation Bright Star in Egypt. The team collected salivary specimens from 490 troops, and the samples are currently being analyzed by a novel Enzyme Linked Immunosorbent Assay (ELISA) for antibodies against RVF virus, as well as other infectious agents. In addition to providing rapid, non-invasive diagnosis of RVF, this unique laboratory assay will determine levels of asymptomatic infection for purposes of assessing immunization need in future deployments to areas of known RVF activity.

Rift Valley Fever in Egypt

In May 1993, RVF recurred in Egypt after a 12-year absence. Infections were first detected in central Aswan Governorate in Upper Egypt. Complaints of visual impairment in several persons, subsequent ophthalmologic examination and serologic testing (anti-RVF virus IgM) resulted in the diagnosis of RVF. Three cases of encephalitis (2 deaths) were confirmed serologically. Abortions in cattle and buffalo were observed in Aswan Governorate from May to August, and RVF virus was isolated from a buffalo placenta in July. On the basis of cross-sectional sero-surveys of humans and animals conducted in August, an estimated 6,000 - 12,000 human infections occurred in the Aswan Governorate, and RVF in animals had extended north along the Nile River Valley into the adjacent governorate. By mid-August, there was evidence that the virus had spread to the Nile River Delta . The number of human cases and severity of disease has been more limited than in the 1977 epidemic. Visual impairment has been the most frequently observed RVF complication.

NAMRU-3 will be continuing to examine this outbreak and has established several surveillance mechanisms to study the disease progression in Egypt further. These include establishment of sentinel flocks of sheep, longitudinal surveillance of villages in the Aswan area and the Nile River Delta, surveillance of slaughterhouse workers and active surveillance for cases particularly in the Nile River Delta.

AFRTS

Negotiations have occurred with Naples and a few satellite dish and cable installation details remain, but NAMRU-3 military personnel will soon get access to Armed Forces Radio and Television Service (AFRTS) as part of the MWR program.

Intensive Care Unit

NAMRU-3 has completed construction of a new Intensive Care Unit at the Abbassia Fever Hospital adjacent to NAMRU-3. This facility is the most modern ward at the Fever Hospital and will be staffed with trained fever hospital doctors and nurses 24 hours a day. Equipment will be provided with funding by USAID.

Supply Division

Congratulations to NAMRU-3 Supply Division for passing the recently conducted Procurement Management Review with flying colors. No major discrepancy was noted and Division staff were commended for their excellent competition rate, excellent purchase document preparation and timely, meaningful Blanket Purchasing Agreement reviews.

THE CO-INVENTOR

by A. David Spevack, NMRDC Intellectual Property Counsel

Who should be included as a co-inventor on a patent disclosure, in the patent application and in the issued patent? A co-inventor must be a person who contributes to the inventive concept.

A recent case highlights the point on what constitutes a co-inventor. The particular invention in issue was a feline t-lymphotropic lentivirus assay. The battle was between the University of California, Davis and Synbiotics Corporations. The University of California, Davis brought suit against Synbiotics to prevent the company from making, using and selling the VIRACHEK/FIV test product. As part of the defense, Synbiotics contended that Marlo Brown should have been considered a co-inventor or discoverer of the FIV virus from which the tests were developed. The record stated, "Brown owned a 'cattery' and observed that her cats had symptoms resembling human AIDS. When the cats tested negative for feline leukemia, Brown brought her cats to the doctors at the University of California, Davis who subsequently isolated the FIV virus as the cause of the illness and derived a means of diagnosing FIV in cats."

In other words, Synbiotics contended that the contribution of raw materials, such as the virus, should make Marlo Brown a co-inventor. The court disagreed stating that the co-invention connotes collaboration of effort to produce a complete and operative invention. One who merely suggests an idea of a result to be accomplished, rather than the means of accomplishing it, is not a co-inventor.

In a different but similar case, the Court held that a person who only suggests a broad idea (wherein the idea is obvious in view of prior art) without further participating in or responsibility for making the invention complete and operable is not a co-inventor. In a third case, the Court held that conception required both the idea of the invention's structure and possession of an operative method of making it.

The court rejected the argument that Brown should be a co-inventor of the FIV virus. At most, Brown suggested that her cats showed symptoms of an immunosuppressive disease and provided researchers at the University of California, Davis with the infected cats. The Court decided that at the University of California, "Drs. Pedersen and Yamamoto's discovery included the identification of a complete and operative method for isolating the new virus, actually isolating the new virus, and a complete and operative method for diagnosing cats that are infected with FIV virus. Brown can hardly be deemed a co-inventor".

GIVING AWAY GOVERNMENT PROPERTY BY TALKING TOO MUCH

by A. David Spevack, NMRDC Intellectural Property Counsel

A researcher can lose the right to an invention by making information pertaining to the invention known publicly or by publishing the information more than a year before a patent application is filed.

Publishing in this context has a broad meaning and includes events such as distributing a sheet of paper describing the invention to several people at a meeting or allowing photographs to be taken of a poster at a meeting. Recently, the Federal Circuit decided a case which has further complicated the situation. In the case of National Research Development Corporation (NRDC) v. Varian Technology Group Ltd., NRDC was the owner of a patent on an apparatus for eliminating systemic noise produced in a nuclear magnetic resonance (NMR) spectrometer during sample analysis. While the NRDC researcher was still developing the invention, his supervisor attended a meeting regarding NMR. At the meeting the supervisor met with an old friend from another company, and in a private conversation listened to the friend's problem and told him about the work being done by his employee. The friend returned to his own company and incorporated the information he received into a machine that his company was working on. The machine was put into regular use within the company to test the company's products. The court held that the patent was invalidated because there was no agreement of confidentiality and no instruction that the information could not be used until a patent application could be filed. There was also no obligation to feedback information such that the work by the friend's company could constitute research on behalf of the NRDC researcher to test the applicability of the invention. Essentially, a valuable invention and company property were lost because somebody talked too soon and too much. It is essential to realize that information about ongoing research within the Naval Medical Research and Development Command family can only be released through the established command mechanism for the release of information and potential publications. It is imperative that any potential inventions be recovered by prompt submission of an invention disclosure.

HELICOPTER INSTRUMENT SCAN RESEARCH AT NAS WHITING FIELD PRAISED FOR POTENTIAL OPERATIONAL IMPACT

by CDR T. Singer, MSC, USN, NMRDC Research Area Manager for Aviation Medicine and Human Performance

CAPT R. O. Abshier, Commander of Training Air Wing Five, recently praised the current helicopter instrument scan pattern research conducted by scientists at the Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, FL.

CAPT Abshier pointed out that the helicopter scan project has tremendous potential for making instrument scan pattern training of student naval aviators more efficient, effective, and safer. He added that the technology NAMRL is currently developing to study the training of instrument scan patterns in helicopter simulators (HT-57C) is equally applicable to fixed wing simulators (T-34). In fact, he noted, it is in the fixed wing simulator that the scan pattern products may have their greatest impact since basic instrument scanning patterns are taught during this phase of all naval aviator training.

NAMRL's scientific staff has already determined that the scan pattern monitoring technology developed for the HT-57C simulator can be easily incorporated into the T-34 simulator. CAPT Abshier commended NAMRL for developing a research program that demonstrates an authentic responsiveness to the Fleet, for soliciting and incorporating Fleet participation and input for the design of products useful to the Fleet, and for generating an experimental program that uses field data to address practical issues in a rigorous, scientific fashion.

STUDY OF STUDENT HELICOPTER PILOTS' VISUAL INSTRUMENT SCAN PATTERNS

The ability of a pilot to visually scan and integrate information provided by flight instruments is one of the determinants of how well a helicopter is controlled. One important area of instruction for student pilots is the selection of which instrument to attend within a given flight context and how to coordinate the information available from several instruments. However, evaluation of the effectiveness of a pilot's instrument scan is generally limited to the successful performance of a given flight maneuver. Researchers from the NAMRL are working closely with helicopter pilot instructors at NAS Whiting Field to identify the major difficulties students face in acquiring an effective instrument scan. A noninvasive eye-tracking device has been installed in a motion-based helicopter simulator. This device provides an on-line, real-time video record of student instrument scanning patterns and flight performance. The video record will be used for debriefings, teaching, and flight grading standardization. This study is the first to gather flight performance data in conjunction with instrument scan data using a device that does not interfere with the behavior of the student. For the first time, an objective standard of operational performance will be applied to evaluate the effectiveness of instrument scan. This research is producing a unique scientific resource - eye tracker and simulator - that can be widely used by the scientific community to study instrument scan patterns and the acquisition of flying skills in motion-based simulators.

Notes from Council

HONORARIA BAN

As previously reported, the Court of Appeals for the District of Columbia had held a statutory ban on the acceptance of honoraria for appearances, speeches, or articles. This activity is unconstitutional as it regards Executive Branch employees (DoD employees are Executive Branch employees).

The Court injunction against enforcement of the honoraria ban has been staid (suspended) as of 28 September 1993 pending appeal. The Department of Justice (DoJ) has filed a request for a writ of certiorari. To resolve uncertainty on this issue, the DoJ has issued a letter of clarification that states that the DoJ, "will not request remedies under 5 U.S. C. app. 504 ... with respect to executive branch employees who receive honoraria between September 28th, 1993 and the date on which the Supreme Court issues it decision in this case."

In simple English that means if you accept an honoraria after 28 September 1993 they won't bring criminal charges against you. Further, the DoJ stated that the term "receive" will include taking money out of any escrow accounts that were properly set up to hold honoraria, as long as the payout occurred after 28 September 1993. Personnel are reminded that 18 U.S.C. §209 prohibits an employee from accepting any salary or contribution to, or supplementation of salary from an outside source as compensation for services as an employee of the Executive Branch.

The Standards of Ethical Conduct prohibit receipt of compensation for teaching, speaking or writing that relates to an employees official duties. This is interpreted as a violation of §209. If there are any questions, please contact Counsel.

HEARING LOSS FROM EXPOSURE TO NOISE IS A MAJOR HEALTH PROBLEM OF MILITARY DUTY

by LCDR Paul L. Knechtges, MSC, USN, NMRDC Research Area Manager for Fleet Occupational Health

The Veterans Administration reported 60,476 hearing loss compensation cases in 1992, with associated compensation costs of more than $230 million. In addition, the Navy paid nearly $8 million in compensation in the same year for 2,560 civilian cases of hearing loss.

To improve hearing conservation, Dr. Gerry Thomas and Dr. Bill Cushman (Poesis Research) at the Naval Aerospace Medical Research Laboratory, Pensacola, FL are developing a new hearing protector. Unlike more expensive prototypes that use electronics, this protector is designed on the principle that sound pressure waves will not propagate through a vacuum.

The protector consists of ear cups with a vacuum space sandwiched between two layers of material. A major challenge to developing this device was designing a gasket that would not transfer sound energy to the wearer. After testing many commercially available materials that proved unsuccessful, researchers formulated a special gasket material and demonstrated it has excellent noise reduction capabilities compared to the commercially available materials. A patent has been filed on the material, and private industries have expressed interest in licensing the technology.

Potential other uses of this new material include energy absorbing barriers in automobiles, aircraft, special military vehicles and equipment and buildings.

The goal of these researchers in 1995 is to incorporate a communications speaker in the hearing protector for use in operational environments; in many operational settings, double hearing protection (plugs and muffs) is required, which interferes with communications. If future testing of the prototype hearing protector confirms the expected noise reduction, the use of double hearing protection could be discontinued.

UPDATE: NMRDC LABORATORY CONSOLIDATION PLAN

The NMRDC laboratory consolidation plan was formulated in 1993 to reduce infrastructure while preserving research capabilities in response to DoD downsizing and related financial and personnel reductions, the Base Realignment and Closure Commission (BRAC), and Project Reliance.

The basic objective of the laboratory consolidation plan is to reduce the number of small laboratory activities and eliminate the Headquarters by consolidating these functions into a Naval Medical Research and Development Center to be located in Bethesda, MD.

Theconsolidation, when completed by the year 2000, will create the Naval Medical Research and Development Center at Bethesda, MD, with the following eight subordinate laboratory activities: U.S. Naval Medical Research Unit No. 2, Jakarta, Indonesia; U.S. Naval Medical Reserach Unit No. 3, Cairo, Egypt; and six detachments located at Brooks AFB, TX; Wright-Patterson AFB, OH; and naval installations at San Diego, CA; Pensacola, FL; Groton, CT; and Lima, Peru.

According to the present time table, the following actions have either been approved or initiated: NAMRU-Det Manila was approved for closure (see page 5), and is presently engaged in closure and relocation activities which will be completed by the summer of 1994. Negotiations with the Air Force have been completed, and the package to establish the Naval Medical Research Institute Detachment, Brooks AFB, San Antonio, TX has been submitted to OPNAV to establish this detachment by October 1994. The realignment request which will disestablish Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, FL and Naval Submarine Medical Research Laboratory (NSMRL), Groton, CT as commands and establish them as Naval Medical Research Institute (NMRI) Detachments are presently being prepared for submission, with a proposed action date of 1 October 1994. Additionally, a request is being submitted to disestablish the Naval Dental Research Institute Detachment at Brooks AFB by October 1994, as well as a request to disestablish the Naval Medical Research Institute Detachment in Kenya.

Over the past several months, a variety of unanticipated actions have occurred which have the potential to affect our present laboratory consolidation effort. Specifically, for the first time, DoD research activities will be examined as part of BRAC process for FY95.

At the present time, the staffs of NMRDC and NMRI are working jointly to plan the transfer of people and programs, from NAMRL and NSMRL to Bethesda. These moves are not expected to begin until FY96, and will be completed by the end of FY00.

Questions concerning the status of all consolidation activities should be directed to CDR McDonough, MSC, USN, who can be reached at commercial 301-295-1499 or DSN 295-1499.

PROGRESS TOWARD UNIVERSAL DONOR BLOOD FOR MILITARY EMERGENCIES Phase I Clinical Trials Using Enzymatically-Converted Red Blood Cells Near Completion

The Navy Medical Research and Development Command is currently supporting clinical trials of transfusion therapy using type B red blood cells enzymatically-converted to type O (universal donor) red blood cells. Converted red cells are used in the same way as native type O cells are used. The Phase I clinical trials at the New York Blood Center and the General Clinical Research Center of the Rockefeller University Hospital are to assess immune response in volunteers and establish optimal treatment conditions for producing enzymatically converted red blood cells. Those trials are almost complete. Phase II testing has been approved by the FDA and is pending. Positive results from the research and clinical trial will not only provide a method to develop a continuous supply of type O red blood cells – cells that may be transfused to recipients of any blood type – but also will make greater use of existing supplies of blood types A and B, which are sometimes unused and discarded. Through the use of enzymatically-converted type O red blood cells, it will be possible to stock-pile by freeze preservation a single universal donor blood group for military emergencies. This would eliminate shortages of blood due to blood group incompatibility, eliminate the necessity for separate storage facilities for supplies of four different blood groups, and reduce the requirements for blood typing under operational conditions. For more information contact CDR P.D. Kent, MC, USN, NMRDC Research Area Manager for Combat Casualty Care, DSN 295-0880 or commercial 301-295-0880.

THE BEHAVIORAL AND PERFORMANCE EFFECTS OF R-134a, A NON-OZONE DEPLETING REFRIGERANT, ARE BEING EVALUATED FOR SHIP AND SUBMARINE USE

In certain operational environments, sailors and Marines are at risk of exposure to environmental contaminants that may threaten their health and degrade operational performance. Currently, ozone depleting substances used as coolants and refrigerants are being replaced with R-134a (1,1,1,2-tetrafluoroethane) and other non-ozone depleting substances. Due to the unique environments aboard ships and submarines, use of R-134a could create scenarios where personnel are exposed to undetectable, low concentrations for extended periods of time or to rapidly increasing concentrations in enclosed areas (R-134a is a clear and colorless gas with little odor or taste). Safety data provided by manufacturers do not provide non-lethal, acute toxicity information. Researchers at the Naval Medical Research Institute Toxicology Detachment at Wright-Patterson AFB, Ohio are developing tests to determine whether performance deficits, behavioral dysfunction and incapacitation without lethality can occur at low levels of concentration or after brief exposures. Additionally, using the tests, researchers will be able to evaluate the toxicity of not only R-134a, but also any oxidative or pyrolysis product from combustion of the substance, another set of data generally not available from the manufacturer. The resulting data will be used to develop models predicting human exposure consequences in actual use situations, to tailor exposure limits during exposure conditions and to recommend medical surveillance and treatment guidelines. For more information contact LCDR P. Knechtges, MSC, USN, NMRDC Research Area Manager for Fleet Occupational Health at 301-295-0885 or DSN 295-0885.

UNAIDED AND AIDED NIGHT VISION TRAINING DEVELOPED

NMRDC's Aviation Medicine and Human Performance Program concentrates on the interaction between military personnel and their working environments. The Naval Aerospace Medical Research Laboratory (NAMRL), Pensacola, FL, in collaboration with the Naval Aerospace and Operational Medical Institute, developed Unaided and Aided Night Vision Training Kits to teach aircrew personnel the idiosyncrasies of night vision. The Unaided Night Vision Training Kit focuses on ways to exploit the strengths of the human visual system in dark operational environments. Through demonstrations involving the central or night blind spot, the physiological blind spot, silhouette recognition, autokinesis, the Purkinje Shift, false horizons, etc., each user experiences several visual illusions characteristic of unaided night operations. The Aided Night Vision Training Kit utilizes electro-optical (EO) devices. The kit illustrates the change in image resolution caused by decreased illumination, the effects of strobes and incompatible lighting, and the importance of correct adjustment of EO devices prior to use. The kits were originally designed for aircrew personnel and are applicable to many warfare specialties. Using input provided by the Army Research Institute and the Army Rangers, the kits are currently being modified for use by Marine Corps and Army ground forces. For more information contact CDR T. Singer, MSC, USN, NMRDC Research Area Manager for Aviation Medicine and Human Performance at DSN 295-0878 or commercial 301-295-0878.