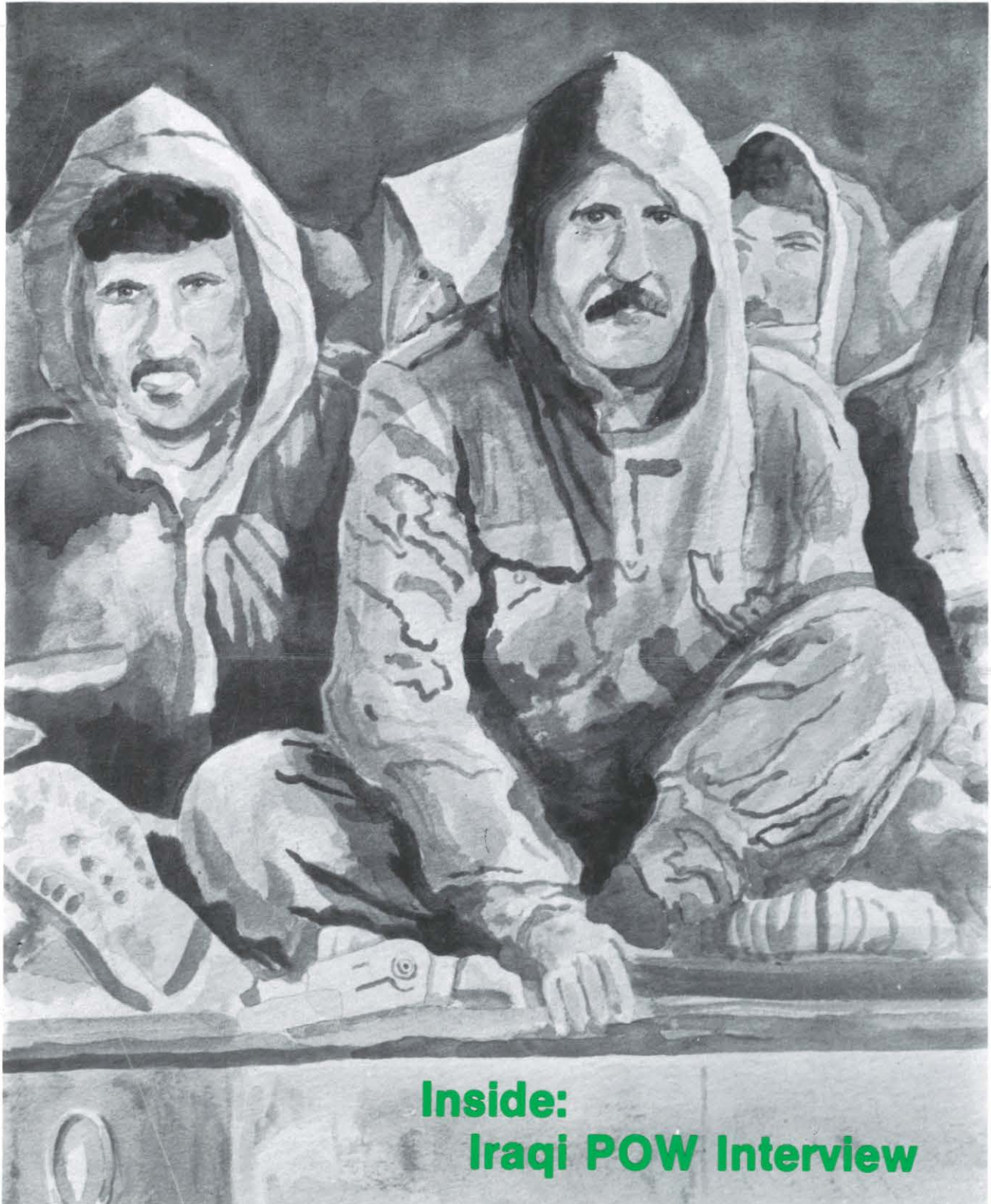


# ***NAVY MEDICINE***

March-April 1991



**Inside:  
Iraqi POW Interview**

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Deputy Chief, BUMED  
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*NAVY MEDICINE*, Vol. 82, No. 2, (ISSN 0895-8211 USPS 316-070) is published bimonthly by the Department of the Navy, Bureau of Medicine and Surgery (BUMED 09H), Washington, DC 20372-5120. Second-class postage paid at Washington, DC, and additional mailing offices.

POSTMASTER: Send address changes to *Navy Medicine* care of Naval Publications and Forms Center, ATTN: Code 306, 5801 Tabor Avenue, Philadelphia, PA 19120.

POLICY: *Navy Medicine* is the official publication of the Navy Medical Department. It is intended for Medical Department personnel and contains professional information relative to medicine, dentistry, and the allied health sciences. Opinions expressed are those of the authors and do not necessarily represent the official position of the Department of the Navy, the Bureau of Medicine and Surgery, or any other governmental department or agency. Trade names are used for identification only and do not represent an endorsement by the Department of the Navy or the Bureau of Medicine and Surgery. Although *Navy Medicine* may cite or extract from directives, authority for action should be obtained from the cited reference.

DISTRIBUTION: *Navy Medicine* is distributed to active duty Medical Department personnel via the Standard Navy Distribution List. The following distribution is authorized: one copy for each Medical, Dental, Medical Service, and Nurse Corps officer; one copy for each 10 enlisted Medical Department members. Requests to increase or decrease the number of allotted copies should be forwarded to *Navy Medicine* via the local command.

*NAVY MEDICINE* is published from appropriated funds by authority of the Bureau of Medicine and Surgery in accordance with Navy Publications and Printing Regulations P-35. The Secretary of the Navy has determined that this publication is necessary in the transaction of business required by law of the Department of the Navy. Funds for printing this publication have been approved by the Navy Publications and Printing Policy Committee. Articles, letters, and address changes may be forwarded to the Editor, *Navy Medicine*, Department of the Navy, Bureau of Medicine and Surgery (BUMED 09H), Washington, DC 20372-5120. Telephone (Area Code 202) 653-1237, 653-1297; Autovon 294-1237, 294-1297. Contributions from the field are welcome and will be published as space permits, subject to editing and possible abridgment.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

NAVMEP P-5088

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**COVER:** Iraqi prisoners of war move to the rear following their capture in Kuwait. Interview on page 24. From a painting by combat artist CDR Chip Beck, USNR.



# Shining Brightly for the Future

**R**etirement from the world's finest is not easy. The magnificent people of this organization made my career personally rewarding, my job as Surgeon General easy, and the Navy Medical Department truly great.

The past 4 years have been tumultuous for us. In June 1987, I became leader of a very different Navy Medical Department. My report to the Secretary of the Navy on the state of Navy medicine was not pleasant. You all remember our problems and I will not list them. It is gratifying to me that your hard work over these 4 years has fostered remarkable progress in resolving our difficulties and in moving us toward becoming a healthy and vibrant organization.

One area that we've worked hard on is the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). A third of our budget goes to that program. To reduce that, we must continue to increase the number of beneficiaries we see in our own facilities; we have a number of initiatives underway that will lower CHAMPUS costs for both the Navy and our patients. We must continue our initiatives designed to increase our capacity to care for patients and to control Navy health care costs, such as our NAVCARE clinics, various other external contracts, internal contracts, and catchment area management. The health care finders (HCF) program allows a patient to place one call and come away with an appointment at either a military medical treatment facility or with a "preferred participating provider." We are seeking the people and resources to expand this initiative.

The current catchment area management demonstration in Charleston, SC, and the CHAMPUS Reform Initiative (CRI) in California and Hawaii are only the beginning. I have testified before Congress that as our participation in creative health care delivery arrangements matures, we are developing a growing appetite for more flexibility than current law or regulation permit. I have asked them to work with us in designing creative managed care strategies for the future.

"Charlie Golf One" became "Charlie Papa"—we are proceeding to assist—during Operations Desert Shield and Desert Storm. Our troops liberated Kuwait, and we were there for them with more than 11,000 Navy medical personnel, ranging from the corpsman advancing with his Marine unit to the active duty and reserve personnel manning three fleet hospitals and two hospital ships. And while

our shipmates were in theater, we continued to provide the highest quality medical care to the families of our warriors. I have never been prouder.

Navy and Marine Corps leaders have freely praised your spirit and responsiveness. One letter I received from the Commandant of the Marine Corps said, "Navy medicine as a whole has shown brightly for all of us!! . . . For many years the Navy Medical Department has promised, 'When you need us, we'll be there;' and you were! . . . The Marines of Operation Desert Shield/Storm are more capable of meeting the mission because Navy medicine is at their side."

I am absolutely convinced that the strategy to achieve higher levels of excellence is through embracing the Deming philosophy. The Navy Medical Department is well on its way to incorporating TQL (total quality leadership) in its daily business. We have already learned much of this new culture in one form or another, and the Naval Medical Quality Institute now provides training that will help refine and focus our efforts and the tools we need to participate successfully in this "health care quality revolution."

I am personally committed to the principles of continuous quality improvement, innovation, and customer focus. I commend them to each of you for adoption in your personal and professional endeavors.

You have all helped to formulate our *Guilding Principles* and our *Mission* and *Vision* statements. Please read and reread them. Focus all your efforts on moving toward our vision. As we build and execute Navy medicine's strategic plan, your active involvement is essential. It is in your commitment and dedication that Navy medicine will stay the course.

It is with pleasure and confidence that I turn over the helm of the Navy Medical Department to RADM Donald F. Hagen. I can think of no one better qualified to steer Navy through the rough waters that lie ahead. Admiral Hagen's experiences have well prepared him to take Navy medicine's helm.

I bid you farewell. I know you will continue to grow and thrive, consistently meeting with competence and innovation all the challenges the future holds, and that you will continue to provide the finest of medical care possible at home, afloat, and abroad. You have my gratitude, admiration, and respect. CHARLIE GOLF ONE.

VADM James A. Zimble, MC

# Flag Officer Selectees

RADM-selectee **Richard A. Nelson**, MC, commanding officer, Naval Hospital, Bremerton, WA, was born on 4 April 1941 near Perkins, OK. He received a B.S. degree from Oklahoma State University in 1963 and his M.D. degree from the University of Oklahoma in 1966. He completed a rotating internship at Baptist Memorial Hospital, Oklahoma City, OK, and a residency in occupational medicine at the University of Cincinnati.

In 1967, Dr. Nelson entered the Navy via Special Doctor Draft Number 41. He spent a short time at the Naval Hospital, Corpus Christi, TX, and then served as senior medical officer at the Naval Ammunition Department, McAlester, OK. From 1969 to 1971, he served as a medical officer at Naval Hospital, Bremerton, WA. From 1971 to 1972, he served as head, occupational medicine branch, Bureau of Medicine and Surgery, Washington, DC. Then in 1974, he became assistant to the director, occupational health division, Navy Environmental Health Center, Cincinnati, OH.

After training at the Nuclear Power Training Unit, Ballston Spa, NY, he

served as director, occupational and environmental health service, Naval Regional Medical Center, Bremerton, WA, from 1975 through 1981. During the same period, he was coordinator of the Fleet Liaison Team. In addition, he served as head, medical department, Naval Submarine Base, Bangor, WA, from 1975 to 1977. He was also assigned additional duty as head, medical department, Puget Sound Naval Shipyard, Bremerton, WA, from 1976 to 1981.

In July 1981, Dr. Nelson assumed command of the Navy Environmental Health Center, Norfolk, VA, and from 1984 to 1985, was the director, occupational health and preventive medicine division. From 1985 to 1988, he was deputy commander for fleet readiness and support, Naval Medical Command, Washington, DC. From 1988 to 1989, he was assigned to the Office of the Naval Inspector General as director, health care review division.

He is certified in occupational medicine by the American Board of Preventive Medicine. He is a member of the American College of Occupational Medicine and the Association of Military Surgeons of the United States.

Previously, he was an assistant professor at the University of Washington College of Occupational Medicine, and served on the Board of Directors, Northwest Occupational Medicine Association. His military awards include the Legion of Merit (two awards), Meritorious Service Medal, and Navy Achievement Medal.

RADM-selectee **Frederic G. Sanford**, MC, commanding officer, Naval Hospital, Long Beach, CA, was born on 2 Oct 1940 in Sayre, PA. He received a B.A. degree from Haverford College, Haverford, PA, in 1962; graduated from the University of Pennsylvania School of Medicine in 1966; and completed a rotating internship at Robert Packer Hospital and Guthrie Clinic, Sayre, PA, in 1967.

After he was commissioned in the Navy Medical Corps in 1963, he served as battalion surgeon, Eleventh Engineers Battalion, Third Marine Division, Republic of Vietnam, from July 1967 to July 1968. Subsequently, he served as a general medical officer, San Francisco Bay Naval Dispensary, Hunter's Point, from August 1968 to July 1969. He reported to the Naval





**CAPT Richard A. Nelson, MC**



**CAPT Frederic G. Sanford, MC**

Hospital, Bethesda, MD, for radiology residency in 1969 and completed training in August 1972. Then he transferred to the Naval Hospital, Portsmouth, VA, where he served as head, radiation therapy division from August 1972 to June 1973.

From July 1973 to June 1974, Dr. Sanford completed a fellowship in radiation therapy at the Medical College of Virginia, Richmond, VA. Following this training, he transferred to the Naval Hospital, San Diego, CA, where he served as head, radiation therapy division from July 1974 to December 1981, and program director, Therapeutic Radiology Training Program from November 1976 to March 1986. In addition, in January 1982, he was named chairman, radiology department, Naval Hospital, San Diego, and began serving concurrently as director of ancillary services in October 1982. He was also assigned as executive officer, Naval Hospital, San Diego, from May 1985 to June 1986.

From 12 Aug 1986 to 30 June 1988, he served as commanding officer,

Naval Hospital, Newport, RI, and in July 1988, he joined the staff in the Surgeon General's office, Washington, DC. He will be assuming new responsibilities on the Surgeon General's staff at the Bureau of Medicine and Surgery, Washington, DC, in late Spring 1991.

Dr. Sanford is certified by the American Board of Radiology and holds a state license from the Commonwealth of Pennsylvania. He is a member of the American College of Radiology, Radiological Society of North America, American Radium Society, American Medical Association, and a fellow of the American College of Radiology. He wears the Combat Action Ribbon, Vietnamese Cross of Gallantry, Meritorious Service Medal, and several unit citation awards.

In 1983 and 1984, Dr. Sanford was a board examiner for radiation therapy, Oral Board Examinations, given by the American Board of Radiology, Louisville, KY. He also served as special advisor to the Navy Surgeon

General for diagnostic and therapeutic radiology from March 1983 to June 1985.

RADM-selectee **William H. Snell**, DC, commanding officer, Naval Dental Center, Great Lakes, IL, was born on 18 Nov 1939 in Montclair, NJ. He received a B.S. in chemistry from the School of Liberal Arts at Tufts University. While a dental student at Tufts University, School of Dental Medicine, Dr. Snell was enrolled in the Ensign 1925 Program. Upon his graduating cum laude in 1965, he was assigned to the Naval Hospital, Philadelphia, PA, for DUINS as a dental intern.

At the completion of his internship, he reported to the commanding officer, U.S. Naval Activities, United Kingdom. This was followed by a tour of duty as a member of the dental department of the U.S. Naval Academy. While at the Naval Academy, he completed a postdoctoral fellowship in fixed prosthodontics. Subsequent assignments included



**CAPT William H. Snell, DC**



**CAPT Mariann Stratton, NC**

the precommissioning crew of USS *Nimitz* (CVAN-68); prosthodontic department at Headquarters Clinic, Naval Regional Dental Center, Jacksonville, FL; head, Branch Dental Clinic, Naval Air Station, Cecil Field, FL; and director of clinical services, U.S. Naval Regional Dental Center, Okinawa, Japan.

Following a tour as the commanding officer, Naval Dental Clinic, Long Beach, CA, Dr. Snell was assigned to the Naval Medical Command, Washington, DC. Here he served in several roles within the direct dental care division of the office of the deputy commander for health care operations. These roles included assistant for dental specialties; head, clinical services branch, and division director. In addition, he served as the first acting deputy commander of the directorate of dental care operations. Following his assignment at the Naval Medical Command, Washington, DC, he served as assistant chief of staff for dentistry at the Naval Medical Command, National Capital Region, Bethesda, MD.

Dr. Snell is a member of the American Dental Association, Academy of General Dentistry, Phi Sigma Kappa Social Fraternity, Delta Sigma Dental Fraternity, and a fellow of the Inter-

national College of Dentists. He wears the Meritorious Service Medal with gold star in lieu of 2nd award, National Defense Medal, Expert Pistol Shot Medal, and holds the Battle "E," Sea Service and Overseas Service Ribbons.

**RADM-Selectee Mariann Stratton, NC**, director, nursing services, Naval Hospital, San Diego, CA, is a native of Houston, TX. She joined the Navy in September 1964 as a Nurse Corps Candidate and was commissioned in September 1965.

Following graduation in May 1966 from Sacred Heart Dominican College, Houston, TX, she was assigned as staff nurse at Naval Hospital, St. Albans, NY, from September 1966 to March 1968. She transferred to U.S. Naval Hospital, Yokosuka, Japan, and served as charge nurse on multiple medical and surgical wards. In April 1970, she returned to the United States and was assigned as nurse programs officer, Navy Recruiting Command, New York, NY. Then from July 1973 to June 1974, she was assigned to the U.S. Navy Dispensary in Asmara, Ethiopia, and subsequently as charge nurse, Fleet Support Office Dispensary, Athens, Greece, until August 1975.

Returning to the United States, CAPT Stratton was sent to Naval Hospital, Corpus Christi, TX, where she served in multiple positions including division head on orthopedic, medical, and psychiatric wards; command education coordinator; and staff detailer, until August 1979. During this period, she also completed an M.A. degree in human resource management at Webster College. Later, in August 1981, after she was selected for Full-Time Duty Under Instruction, CAPT Stratton received her M.S. degree in nursing and her certification as an adult nurse practitioner from the University of Virginia. Following graduation, she was assigned as patient care coordinator, Naval Regional Medical Center, Charleston, SC, until March 1983. Subsequently, she served as the Nurse Corps plans officer, Naval Medical Command, Washington, DC. In November 1986, she was transferred to U.S. Naval Hospital, Naples, Italy, as director, nursing services.

Her military decorations include the Meritorious Service Medal with gold star in lieu of 2nd award, Navy Achievement Medal, Navy Unit Commendation, National Defense Service Medal, Expert Pistol Shot Medal, and Overseas Service Ribbon. □



# Mercy's Combat Gynecologist



PH1 R.J. Oriez

**T**he multinational effort, Operation Desert Shield/Storm required the largest mobilization since the Vietnam era. Hundreds of thousands of soldiers, sailors, marines, Coast Guardsmen, and airmen from all over the United States joined their counterparts from other nations on the seas and in the deserts of the Middle East. This massive concentration of personnel far from their home bases placed severe demands on support services, including medical treatment.

In response to this abruptly increased responsibility at the onset of the mobilization in mid-August, BUMED ordered the hospital ships USNS *Mercy* (T-AH 19) and USNS *Comfort* (T-AH 20) to the Arabian Gulf.

During the Persian Gulf war, USNS *Mercy* had a hospital staff of about 900 active duty naval personnel, in addition to the ship's operating crew of about 70 civilian mariners. There are 12 operating rooms in the Medical Treatment Facility's (MTF) main complex, with two additional dental operating suites. These are supported by a 50-bed casualty receiving area, a 20-bed recovery room, and an 80-bed intensive care unit. To maximize the

**CDR Metz discusses a problem with a patient during her medical stay aboard *Mercy*.**

MTF's combat casualty capability, the medical staff comprised a wide range of surgical and medical specialists. Specialties included orthopedics, thoracic surgery, urology, neurology and neurosurgery, ophthalmology, otolaryngology, nephrology, and cardiology, in addition to general and trauma surgery.

One aspect of the personnel profile involved in the Middle East mobilization unique in U.S. military history was the large number of active duty women in the theater of operations. Estimates are that women comprised almost 11 percent of the troops assigned to Operation Desert Shield/Storm. In addition to performing traditional roles in administrative support, logistics and supply, and medical care, women operated heavy machinery, worked in repair and communications facilities, and even carried weapons. For women serving in the Middle East, yesterday's oddity has become today's norm.

The feminine hue of the military population in this operation resulted in some unexpected logistics and medical requirements. One person who became acutely aware of this was *Mercy's* gynecologist, CDR Stephen A. Metz, MC. "When I first found out that this combat casualty care facility had a billet for a gynecologist, I said, 'you've got to be kidding.' Like most people, my concept of combat medicine was based on what I learned from 'M.A.S.H.' However, since I've been aboard, it's become clear that my presence has really served a purpose."

That the capability for gynecologic support on hospital ships was necessary was a lesson learned from the training and humanitarian mission to the Republic of the Philippines and other locations in the South Pacific conducted by *Mercy* in 1987. As a result, the ship's medical allowance did contain a small quantity of supplies and equipment. "We were fortunate that some of the ground work had been laid during that mission," Metz said.

Since that deployment, the ship had been tied to the pier at Oakland Naval

Supply Center waiting to be called to service. A cadre crew of about 50 military and civilian personnel were charged with maintaining the ship and its supplies.

"We owe a lot to the ship's cadre crew. They did an excellent job of upkeep on the equipment, so we didn't have to worry about that. They were also able to provide us with a detailed list of the supplies already aboard when we reported. Therefore, even though we had 4 days to get the ship ready for sea, we used the time effectively to move supplementary equipment and supplies from Oakland Naval Hospital to *Mercy*. Of course, in any undertaking conducted in such a hurry, one can't think of everything. But by the time the ship set sail, we had the basics required to open up shop," Metz pointed out.

"There is one other requirement before a gynecologist can function effectively," he added. "The capability to prepare and interpret cytologic and tissue specimens is critical to my specialty. Luckily, the ship's complement included a pathologist and histopathology technician.

"Once we got underway, the goal of the medical department was to be open for business as quickly as possible. For me, that meant finding a space where I could perform gynecologic examinations in such a way as to provide the patient privacy, to collect and organize my equipment, and to find and train an assistant to help both with patient care and with followup." Metz found a receptive and helpful team in the personnel of the *Mercy's* sick bay, and within a week he was able to open a biweekly scheduled gynecology clinic.

Since then, business steadily increased. Initially, patients came primarily from the ship's crew. When *Mercy* arrived on station, other commands began to contribute to the patient load. Metz may have been one of the few gynecologists that made "house calls." "In one port, we were anchored near USS *Acadia* (a repair ship whose crew includes a large contingent of women). Rather than have all of them come to see me, I went over

to their sick bay and held consultation clinics there."

In October, the ship pulled into the port of Ad Dammam in Saudi Arabia for 2 days. Tours of the facility were planned for about 200 Saudi Arabian medical care representatives and some media. At the time, part of the Army's First Air Cavalry Division was in the port area. The morning after the ship's arrival the tours began. The final count was almost 300 Saudi medical representatives and over 1,500 U.S. servicemen and women. Many of those stopped by sick call to take advantage of the hospital's presence. By popular demand, "*Mercy* Gynecology, Ltd." was open for business the next day.

"We certainly were busy that day," Metz said. "The deployment of the U.S. forces happened so quickly that many people couldn't complete all the preparations because of lack of time and resources. For many of the women, that meant foregoing the annual gynecology examination. Our presence made it possible to rectify that omission. It made us feel good to be able to help so many individuals.

Most of Metz's practice was routine outpatient gynecology. One unexpected benefit of the pace was that more time was available for patient education regarding such issues as breast self-examination and contraception. "At Oakland, the patient load limits our ability to engage in this important aspect of patient care," said Metz.

Opening a gynecology practice at sea, however, did not always proceed smoothly. Occasionally, Dr. Metz had to rummage deep into his bag of tricks to find an alternative method when the usual way of performing a common gynecologic procedure wasn't available. Sometimes his improvisation provided a lot of amusement to his colleagues. "You should have seen the looks I got when I asked to use the Ear, Nose, and Throat operating microscope for colposcopy (a method for examining the cervix under magnification)," he said with a laugh.

*Mercy's* primary mission was to





**USNS *Mercy* (T-AH 19)**

provide urgent medical care to injured military personnel. If a situation arose where a large number of patients had to be evaluated and treated in a short time, as could easily have occurred during military operations, even a large medical facility such as *Mercy* could have been overwhelmed unless the patients were appropriately sorted according to the urgency in which they needed attention. Prioritizing patients in this manner, called triage, was Metz's job.

"Patients brought in during a mass casualty situation don't generally require the specialized skills of a gynecologist," Dr. Metz explained. "Triage involves assimilation of a lot of information in a short period of time, then rapid decision making based on that information. My experiences working in busy labor and delivery units has proven useful in this type of environment." In order to prepare for its principal mission, the *Mercy* crew conducted regular mass casualty drills designed to maintain the efficiency of the ship's patient flow procedures.

The primary means of patient transfer to *Mercy* was by military helicopter airlift to the ship's landing platform. Mass casualty drills were designed with varied numbers of patients arriving on the ship with differing degrees of severity of injury. Simulated casualties included such

entities as shock, gunshot and shrapnel injuries, burns, and heatstroke. The drills usually included some "patients" exposed to nerve or chemical weapons in order to train the ship's decontamination teams. These patients had to be thoroughly decontaminated before they could be brought into the MTF.

Metz identified another avenue for contributing to the care of combat casualties. His training and experience in gynecology resulted in the development of surgical skills which he anticipated would be needed had there been an influx of large numbers of patients requiring surgical care.

"The surgical skills of a gynecologist are very compatible with those of other surgical specialists. I had the unusual opportunity to assist other specialists, especially our urologist, CDR John Miller, with their cases. This helped me maintain my skills while at the same time expanded my range of experience and increased my awareness of the concerns peculiar to other specialties."

The deployment aboard *Mercy* was a learning experience for everyone. Training became a large component of the ship's schedule. The watchword for the crew was "maximum flexibility" during the exercises to perfect the logistics for accepting large numbers of casualties. Often significant adjust-

ments were required to optimize medical care delivery in the shipboard environment, with its special architecture and safety requirements. A major additional concern of the medical staff was maintaining surgical and medical skills during this period of low professional activity.

"We have had to accept that, as the ship was brought into service on such short notice after a long period of inactivity, we didn't have everything we would have liked. Resources were limited, and there were a lot of competing requirements for logistics support. This was not a perfect situation. But our commitment remained to provide the service member—male or female—with the best medical, surgical, and dental care possible. We adapted, improvised, and 'jury-rigged' to do whatever it took to fulfill that commitment. I think all the specialists who served aboard would agree with me.

"It was an especially nice feeling to be able to assure women who have been sent out here as part of Desert Shield/Storm that their specialized medical requirements were not forgotten," said Metz. "We on the *Mercy*, and our counterparts on the *Comfort*, were always on station ready to assist." □

—Story by CDR Stephen A. Metz, MC, and LT K.E. Stefansson, USNS *Mercy*.

# Fleet Hospital 5's Dental Department

**A**s a blazing sun dawned over the endless desert, personnel of the Dental Department at Fleet Hospital 5 prepared for another day of Operation Desert Shield/Storm. The department, headed by CAPT J.D. Matheson, DC, comprised five dental officers and 18 dental technicians from Naval Dental Center, Norfolk, VA, and the Dental Department of Naval Hospital, Portsmouth, VA.

The dental contingent departed the Norfolk area later last summer with other members of the hospital staff and, immediately upon arrival in Saudi Arabia, constructed and outfitted the 500-bed medical and dental complex command by CAPT R.A. Mayo, MC. As part of the military's Maritime Pre-Positioning Ship Concept, the hospital and all equipment were packed in metal ISO containers aboard a large cargo vessel and brought pier-side for assembly.

Initially, the dental spaces were little more than an empty tent shell situated

off the 1,200-foot main passageway of the sprawling tent hospital. Seasoned Arabian veteran DT3 T.B. Worley viewed the enormous task that awaited them as an opportunity to support his fellow shipmates in the event of armed hostilities. He recalled that the 12-hour days in 120° heat pushed their endurance, but in time they were able

to provide ideal care for their patients in a cool, well-organized environment.

Members of all branches of the U.S. Armed Forces were provided treatment through sick call as well as regularly scheduled appointments. The international participation in desert operations resulted in a wide range of "foreign patients" being treated. On



**DT2 Edward Lassiter and DN Michelle Darmanie provide dental care.**



## Fleet Hospital 5's Dental Department tent.



one particularly busy day a member of the Queens Royal Irish Hussars Tank Battalion reported in with several fractured teeth, immediately followed by a Czechoslovakian seaman off a Norwegian flagged cargo ship with a broken denture.

Since patients arrived for treatment at all hours of the day and night, there were two shifts scheduled from 0700 until 2100 and an on board duty section maintained the clinic during the early morning hours.

In contrast to stateside conditions, patients arrived at the clinic for treatment in unorthodox vehicles. Army Blackhawk and Marine Corps CH-53E helicopters ferried litter-bound medical and dental patients from as far away as 150 miles while ambulances and trucks arrived from nearby camps. Due to logistic requirements, sick call patients were examined, diagnosed, and treated generally at the same visit. In cases of surgical involvement, patients were admitted to one of 14 wards while preparations could be

made for treatment in three fully-equipped operating rooms.

The pace of clinic activity could only be described as hectic. With few exceptions, such as limited prosthetic and orthodontic services, virtually all treatment available in stateside clinics could be provided in the department. The large volume of patients made the

Dental Department one of the busiest clinics in the hospital.

Had the Persian Gulf war produced the anticipated influx of casualties, dental personnel would have supported the medical department and been utilized in such capacities as casualty triage officers, ambulance drivers, litter-bearers, and security personnel. The department's oral surgeons would have assisted in the operating rooms as surgical assistants and were prepared to augment as anesthetists.

As events developed in the Middle East, the Dental Department at Fleet Hospital 5 continued to provide treatment to a wide range of U.S. military personnel and other Coalition forces. In the strongest tradition of the Dental Corps and dental technician rating, personnel under their care received the most concerned and professional attention possible. □

—Story and photos by LCDR Thomas D. Walczyk, DC, Naval Dental Center, Norfolk, VA.



**DN Stephen McGettigan operates the clinic's X-ray developing machine.**

## A Unique Challenge for Navy Medicine

# Swimming Against the Fiscal Tide

CAPT Arthur M. Smith, MC, USNR

*As the United States emerges from the Persian Gulf crisis with a victory under its belt, the military services and especially the Navy Medical Department, face greatly reduced budgets and fundamental changes in the way they will conduct business. Even as the nation waged war, plans to downsize the military proceeded apace. The implications for Navy medicine, under budgetary attack even before the war, are profound. Everything from recruiting to retention, from graduate medical education to the way we run our hospitals, from the role of the Reserve to the future of our hospital ships and fleet hospitals will be examined under the proverbial magnifying glass. Our ability to perform the mission and even our very survival will depend on how well we improve, streamline, and deliver quality health care—for less.*

*In this issue we inaugurate Forum, a section where Medical Department members can exchange ideas and engage the controversies now being thrust upon us.*



**A** Navy spokesman once noted, "Every move of a uniformed medical billet, or body (i.e., a physician), carries with it an implied 'CHAMPUS opportunity cost' somewhere in our system, and we have stewardship for that cost." In essence, every medical officer is now equated with a dollar value in terms of offsetting CHAMPUS expenditures. Is it consequently reasonable that mobilization-related operational training for Navy medical personnel be curtailed, not because of the direct costs involved, but because of the feared impact upon CHAMPUS expenditures at the hospitals from which they would be absent during training periods? In the current atmosphere of intense competition for a finite and limited base of Navy resources, Navy medicine has been faced with a broad array of paradoxical and, at times, conflicting pressures, many of which originate largely outside of the organization. Such pressures have tended to expand the scope of Navy medicine's responsibilities without either provision of clear means for their execution, or recognition of the incongruity of the roles being assigned to it.

### **The Mission**

Despite the recent Flag level "Medical Blue Ribbon Panel," there still exist major uncertainties regarding the degree to which Navy medical resources should be justified and organized to respond to a spectrum of clearly differentiated needs. These "organizational needs" have also been described as Navy medicine's "conflicting imperatives."

- One mission obviously entails the day-to-day medical support of active duty forces in peacetime, ensuring that the highest standards of physical, mental, and dental health are maintained. Part of this requirement also entails the continuing assignment of medical personnel to the operational forces. Fully 14 percent (a total of 520) of all Navy physicians and 28 percent (7,400) of all hospital corpsmen are assigned full time to afloat Navy or deployed Marine units. Not only are a large number of major Navy hospitals and clinics also staffed by medical and allied health care personnel, but contingency support to operational units must also be provided, as needed, from the manpower pools within these facilities.
- An additional area of major responsibility consists of readiness and planning for the extraordinary and often unforeseen medical support requirements of the contingency armed conflict environment.
- While accomplishing these aforementioned responsibilities Navy medicine has a third major obligation, which is to serve the medical needs of the substantial and burgeoning

community of nonactive duty Navy beneficiaries.

### **Accountability and Governance**

Navy medicine has become accountable, as well as subject, to the interest and direction of an increasingly complex and well-staffed governance and accountability structure, consisting of a variety of Navy and external agencies. Unfortunately, this structure for governance above Navy medicine has grown. These overseers include many subordinate codes within the offices of the Secretary of the Navy, the Chief of Naval Operations, and the Joint Chiefs of Staff. Furthermore, numerous other "interested" groups are located within the Department of Defense, the Office of Management and Budget, Congress, outside professional and accrediting bodies, as well as the other armed services. This growth has imposed significant new workload burdens upon the central directorate of Navy medicine, especially in such areas as resource justification and data reporting.

In years past, these many outside interests would not have been likely to intercede in matters once viewed as entirely "professional." The breadth and growth of their interest, however, is related to a number of realities: the increased cost of military health care services, greater cognizance of and interest in the quality of care, interest in the all-volunteer concept and problems resulting from it, and the interest by these external groups in fostering greater cooperation and coordination among the military medical services, as well as between military medicine and other federal and civilian medical organizations.

### **The Federal Government Environment**

There are also certain characteristics inherent to the federal government environment that impact significantly upon Navy medical practices. These include administrative systems that limit flexibility, and often result in control by detail and input, rather than by responding to results. Furthermore, there are periodic requirements to devote particular attention to concepts and systems which are currently enjoying interest at higher levels. Unfortunately, many of these concentrate on peripheral issues, rather than matters fundamental to mission performance. Predictably, they decline in importance with the passage of time and turnover of government personnel. This is further abetted by the imposition of political considerations upon otherwise mission-oriented decision-making criteria.(1)

### **Navywide Factors**

Changes have also taken place within the Navy itself, thereby limiting the choices of Navy medical administra-

tors. These include the regionalization of key support activities such as military personnel services, civilian personnel services, disbursement and accounting operations. Also centralized have been integrated manpower planning, including central requirements determinations and allocations for civilian and military manpower, training, recruitment, and reserves.

### **Beneficiaries of Navy Medicine**

Historically, the only beneficiaries that Navy medicine has been obligated by law to service *directly*, are the active duty forces. By statute, care for other beneficiaries (dependents, retirees and their dependents, etc.) was to be provided on a *space available basis* only. A credible opposing view, couched in terms better known as "personnel policy," has held that since military health care has been traditionally extended to dependents and retirees, the provision of such care is now generally considered as a "rightful benefit." Consequently, any moves to limit such care would tend to reduce the attractiveness of the military as a career. This would be considered as a violation of a long-standing but unwritten agreement. The result would be a reduction in the incentives for retention of vital cadres of active duty personnel in those military specialties which require frequent assignment to sea duty, while their families remain ashore.

It must also be noted, however, that the Navy's capacity to attract and retain the skilled health care personnel necessary to meet contingency requirements is *also* dependent upon an environment that offers a full range of medical experiences. In order to maintain the supply of qualified and experienced medical personnel, Navy medicine supports within its hospitals a large number of professional training programs for physicians, together known as Graduate Medical Education. Indeed, over one third of all Navy physicians are assigned to training billets. Such training experiences are only made possible by a substantial beneficiary population in need of a broad spectrum of medical care. The relatively recent assumption of responsibility for CHAMPUS funding, however, has now given Navy medicine a fiduciary responsibility for this personnel service as well, and at least now makes it directly responsible for managing the availability of health care to all its legal beneficiaries both within and without its own treatment facilities.

### **Health Care Environment**

The driving force behind contemporary medical practice is a commitment to continuing sophistication and change, all resulting from ongoing basic and clinical research. The American people have had a long infatuation with technology and innovation. This predisposition, shared by patients, physicians, and hospitals alike, has been imprinted upon our health care system, both civilian as well as military. Resulting advances in medical knowledge and technique have been translated into improved diag-

nostic, therapeutic, and rehabilitative procedures during the past several decades. All these advances in technology and professional practices have ultimately been applied to the treatment of patients.

In the civilian sector, as well as the military, the United States economy has heretofore allowed the relatively unencumbered availability of funding for the continuous modernization of hospitals, offering not only the fruits of modern research and technology, but the employment of more sophisticated staff personnel to provide these services. This is augmented further by a sophisticated system of undergraduate medical education, residency and fellowship training, that produces large numbers of physician specialists and subspecialists who are attuned to the application of these modern availabilities in the care of patients.

All the aforementioned advances, however, are increasingly expensive. As long as the American people desire access to more and better care, and there is no reason to believe that this will change, medical expenditures will continue to climb. Nationally, medical expenditures increased from \$280 billion in 1980 to approximately \$620 billion in 1989. Defense expenditures for health care have also grown significantly. While there are concurrent, although conflicting pressures within the Navy to provide "state-of-the-art" health services while simultaneously containing cost increases, there are, unfortunately, no low-tech, low cost medical care alternatives available.

Other issues also abound in the medical care arena. In the current "consumer-oriented market," not only are there demands for greater proficiency in the delivery of health care services, but there also exists a reduced acceptance of the uncertainties of medical science. Reduced confidence in the judgment of the medical professional has also occurred, resulting in an increased frequency with which medical opinion has been subjected to challenge by those outside the profession. This includes those who exercise legislative and administrative control over health care funding, as well as those who utilize the services of Navy medicine.

### **Resource Stringency and Productivity Demands**

Congress and the Executive Branch have endeavored to reduce overall military and civilian staffing, and to scrutinize requests for funds carefully. This environment of resource constraint has been accompanied by demands for productivity increases and initiatives toward better systems for measuring, justifying, allocating, and organizing resources in military medicine. Regrettably, the resource constraints and demands for productivity increases place Navy medicine in the difficult position of having relatively fewer resources with which to manage greater areas of responsibility, both operational and professional.

These conflicting demands create a paradox for Navy medicine because there are important distinctions between the resources required to sustain ongoing routine services and those required for contingency services. The assump-



tion of contingency responsibilities requires the retention of "calculated overcapacity," i.e., the maintenance of capabilities that are deliberately underutilized under normal conditions so that they can readily be deployed when contingencies arise. Is Navy medicine to be staffed and manned for its wartime mission or its peacetime role? For example, the manpower and physical facility requirements for various medical specialties and patient services differ between one organization heavily committed to pediatric, obstetric, and geriatric care, as opposed to one preparing to support combat casualty care in various locations around the world.

### The All-Volunteer Concept

In the face of demands for increased cost-effectiveness and productivity, certain facets of the all-volunteer concept have also imposed new and costly requirements upon Navy medicine.

Prior to the All-Volunteer Force, Navy medical personnel who were derived from Selective Service acquisition were in some respects a renewable resource. This permitted a flexibility in personnel assignments which was aimed primarily at meeting the Navy's needs. Under the all-volunteer concept, however, medical personnel—especially those with critical expertise—have not been as readily available. Consequently, personnel practices commonly strive to meet not only the Navy's needs, but also the personal needs of naval personnel, if adequate retention levels are to be ensured.

For many years, budgetary restrictions upon end strength, as well as the actual numbers of Navy physicians, had fallen short of evident demand. This occurred despite expensive medical school scholarships and training programs designed both to attract medical students and physicians into Navy medicine and retain them in the Navy. This has placed constraints upon Navy medicine's ability to meet the operational needs of the fleet and the Marine Corps, as well as the patient care demands of the burgeoning numbers of military beneficiaries.

During a period of increasing technological sophistication in medical science, Navy medicine also faces a conflict between resource constraints and increasing demands to enhance and monitor the quality of health services delivered to its beneficiaries. The technological advancements in medicine have generally resulted in the need for more sophisticated and specialized equipment, as well as highly trained personnel to use, support, and maintain these resources. Furthermore, in the Navy, as elsewhere, concern about the quality of care has led to the introduction of time-consuming and costly multiple reviews of admissions and care decisions by physicians. Consequently, Navy medicine must maintain a high level of care contemporaneous with what exists in the civilian sector. This is important in order to avert accusations from external accountability forces that beneficiaries are receiving less than optimal health care, and also to prevent the loss of

professional staff who are unwilling to sustain a professional relationship with an organization dedicated to "second-class medicine."

### The Bottom Line

The danger then exists for unfavorable cost comparisons that do not reflect the important distinctions between resources required to sustain ongoing routine services, and those required for contingency purposes. These comparisons co-mingle contingency costs and service costs, between medical support as provided by the military and that provided by other types of civilian health care organizations. Such comparisons could readily lead to the degradation of the contingency response capabilities of the Navy Medical Department, the maintenance of which is a critical part of the department's mission.

The leadership of Navy medicine thus faces a major and divergent administrative responsibility. It must provide technical guidance as well as direction to a health care system involving hundreds of millions of dollars, and thousands of people. Not only must it possess the flexibility and capacity to manage the entire spectrum of contemporary issues facing Navy medicine daily, but it must also identify and address others of comparable dimension that are likely to arise in the future. The importance of this role, and its impact upon BUMED's resource requirements and utilization, must be conveyed in an understandable manner to the organizations and institutions to which Navy medicine is accountable.

It thus behooves the Navy Medical Department's leadership to clearly and persuasively articulate a rationale for protecting Navy medicine's needs in the face of a major budgetary downturn. They must make a plea for allowing the structure of Navy medicine to survive not only intact, but also in a state of readiness for the inevitable challenges that it will face in the future. It is imperative that the Navy Medical Department's leadership and spokespersons of Navy medicine, more forcefully than ever, inform and educate higher authority to distinguish more clearly between the costs of routine peacetime medical care and those associated with the maintenance of contingency capabilities. Without a better general understanding of these multiple roles, draconian cuts in budget may ensue, thereby crippling the ability of medical personnel to respond to the Navy's needs during times of war.

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# Health Promotion

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## Concepts for Progress

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CDR Kenneth A. St. Andre, MC, USN

**H**ealth, a pressing personal need, has become an equally critical issue for American society as a whole. Industry, a predominant financier of health-related services, is reacting to the burden of high health care costs. Its reaction is characterized by reductions in the services offered under employee health care plans and increasing emphasis on prevention and health promotion. Health promotion efforts have been adopted in an attempt to reduce overall expenditures resulting from both lost worker productivity and the treatment of illness.<sup>(1)</sup>

The Navy, if viewed as an industry, is subject to the same pressures from the increasing cost of health services. The Navy Medical Department, in essence a large multihospital health maintenance organization, is being called upon to adapt in the same ways the rest of the nation's health services organizations are adapting. Health promotion, then, is a new but critically important mission for Navy medicine.

As we approach this new problem, it is vital that the exact goals of the health promotion program be defined and a uniform set of definitions and concepts about health promotion exist in the organization. This article will present several concepts and definitions regarding health promotion from a public health perspective. It is intended to serve as a starting point for the formalization of a set of organizational concepts and definitions for the Navy Medical Department.

### Health Fostering or Disease Detection

The first and most important step toward an organizational policy of health promotion is to clarify the difference between primary prevention and secondary prevention. *Primary prevention* is a set of activities that cultivate health in a manner such that illness does not occur. *Secondary prevention* consists of activities that attempt to detect and treat illness early in its course and promote health by decreasing the duration of the illness or the disability it produces. Health care professionals are trained and skilled in activities that are by nature secondary prevention. While an organizational view of health promotion based on a secondary prevention model will be easily understood by the members of the organization and easily adopted, it has distinct limitations.



Secondary prevention measures are limited by their effectiveness and by our understanding of the disease processes. The effectiveness of an action is a measure of its ability to produce results. The results of secondary prevention programs are determined both by their efficacy and by the availability of the service to the individuals who need it. Our understanding of the disease processes includes not only the specific pathophysiology of diseases but also the distribution and incidence of diseases within the population.

If we have an incomplete assessment of the spectrum of disease in our population or individuals are unable to obtain the necessary screening and treatment services, a health promotion policy based on the secondary prevention model will have reduced impact. In addition, secondary measures only limit the impact of disease that is already present and so promote health only to a limited degree.

On the other hand, primary prevention ideally aims to establish a lifestyle and environment around individuals such that disease never occurs. It seeks to reduce every individual's chances of being exposed to the risk factors for disease. This approach is not completely free from limitations. While early detection of disease has measurable goals and timely indications of program success, primary prevention effects may be imperceptible for years. In addition, the cost of this policy may appear to be high when measured in terms of improvements among persons at risk. This occurs because disease-preventing measures must be applied to all members of the population including the young and well. Few young, healthy individuals develop the diseases usually targeted for prevention (heart disease, cancer, etc.). On the other hand, the cost of this approach to health promotion decreases when viewed in terms of reduced days of disability or years of productive life lost.(2)

The health promotion program developed by the Navy should include both primary and secondary prevention components. The limitations associated with each approach should determine the relative emphasis each component receives in the overall composition of the program.

### **Health Fostering or Health Advocacy**

The second step in developing an organizational policy toward health is to understand the difference between a "health fostering" approach and a "health advocacy" approach. *Health fostering* activities are forward-looking, management control measures designed to promote quality lifestyles in the population and a quality physical and social environment in which people may live. *Health advocacy*, in contrast, aims to provide individuals with a knowledge of the characteristics of a healthy lifestyle and a healthy environment, letting the individual make the change.(3)

Health advocacy, or health education, does have an effect in promoting health, but its effects are limited by

differences in perspective that exist between the developers of the education program and the target audience for the program. Also, different segments of the target audience will respond to the same education strategy in different ways. These differences are produced by variation in the social and physical environments in which individuals live and work.

Within the Navy, for example, these environmental differences distinguish members of the submarine community from those of the surface or aviation communities. Similarly, differences exist in the rules of social etiquette and in the lifestyle of individuals who are considered successful among the various levels of rank and among the different ratings and subspecialties. Race and gender are also included in these environmental differences.

If a health promotion program policy is limited to or primarily based upon a health advocacy approach, its effectiveness in the Navy will be restricted by these environmental influences. On the other hand, a program based on a health fostering approach, enhanced by health education components, has much greater chance for success.

If the image of a successful person in some subpopulation of the Navy is that of free time, freedom from exertion, a cold beer, a huge steak, and a cigar; no amount of enthusiastic advocacy will produce a change to a more healthful lifestyle. Health fostering, by changing the organizational culture and environment, can produce the desired results.(4)

### **"Enough of Programs"**

Experience in injury prevention research has determined that activities most successful in promoting health are those that require the least amount of monitoring of individuals in order to ensure compliance with the program. (5) Simply stated, "That promotes best which requires monitoring least!" "Programs" which involve extensive systems of reports and bureaus are unpopular with both those subject to the monitoring and those required to do the monitoring. This poor popularity decreases feasibility. Poor compliance with "programs" due to this decreased feasibility and their restricted success as indicated by injury prevention research, produce a strong case for a health promotion program based on the health fostering approach.

### **A Framework for Development**

While health promotion is a seemingly simple and exciting idea, it can readily fail as an endeavor if the concepts previously presented are not understood. In addition, the attributes and limitations of each approach must be considered. A functional health promotion program should contain components that are educational, aiming to change the individual, as well as components that aim to change the environment. The program should contain activities directed at primary prevention while retaining the effective secondary preventive measures.

Development of a health promotion program should begin with an evaluation of the Navy population to determine its specific health problems. A plan of action specifying the exact mix of health promoting methods and the relative emphasis each approach will receive should be developed for these specific health problems. Once decisions have been made about the mix and the relative emphasis each system will receive, a rational framework is required for use in evaluating and selecting specific policies and program components. Haddon has developed a framework that would be highly useful as an aid to this policy development.(6)

### The Community as the Patient

Shifting the focus of Navy medicine to include health promotion requires that the entire health care organization assume responsibility for yet another patient. This new patient is unique because the patient is not an individual. The new patient is the *Navy community*. As with any patient, this patient will need a complete history and a thorough physical examination. This should include epidemiologic studies of the incidence of diseases within the Navy community and evaluation of the health promoting efforts already in place. Additional testing may be indicated by our initial examination. Identification of the disease risk factors that are specific to our community will be necessary. Finally, after having developed our problem list, a problem-oriented plan of treatment can be implemented.(7,8)

The health of the Navy community can be promoted.

This important new mission for Navy medicine provides many opportunities for us to demonstrate the high quality of the Navy medicine team. The formalization of a set of organizational concepts, definitions, and goals represents the first step in this opportunity to improve the quality of the Navy community.

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## New Navy Surgeon General

RADM Donald F. Hagen, MC, has been selected for promotion to vice admiral and becomes the Navy's 31st Surgeon General. He will relieve VADM James A. Zimble, MC, in a 28 June change of command and retirement ceremony.

Hagen is currently Commander, National Naval Medical Center, Bethesda, MD.





## Navy Medicine Sculpture Underway at Navy Memorial



Navy medicine is sponsoring a bronze bas-relief to be installed on the sculpture walls flanking the Pennsylvania Avenue entrance into the U.S. Navy Memorial in Washington, DC. It is one of 22 such sculptured bas-reliefs honoring major Navy components or depicting historic naval scenes. The 36- by 32-inch bronze was done by sculptor Antonio Tobias Mendez of Knoxville, MD.

The Navy medicine bas-relief will honor all personnel of the Navy medical team—those of the Medical Corps, Dental Corps, Nurse Corps, Medical Service Corps, Hospital Corps, and dental technicians.

"I enthusiastically support the placement of a bronze bas-relief sculpture at the U.S. Navy Memorial in honor of our Medical Department colleagues whose sacrifices in war and peace have earned the lasting admiration of our countrymen," says Navy Surgeon General VADM James A. Zimble, MC. He adds, "(the design) shows a



Navy doctor, who with the help of a Navy nurse, is examining a patient just brought to a hospital ship by a medevac helicopter. Two hospital corpsmen are making ready an I.V."

The Congressional Law which authorized the building of the U.S. Navy Memorial stipulated that all construction costs had to come from private donations. Sponsorship of a bas-relief is for \$50,000.

"Because of the fine support thus far by Navy Medical Department personnel," reports Navy Memorial Foundation President RADM William Thompson (Ret.), "less than \$18,000 remains to be raised in order for the Navy medicine sculpture to join the others on the sculpture walls.

Individuals or organizations desiring to join in this historic project and pay tribute to Navy medical professionals of the past, present, and future, may send contributions, which are tax deductible, to: U.S. Navy Memorial Foundation, Box 96570, Washington, DC 20077-7685.

Donations may be made by check or credit card (Visa—MasterCard). When using credit cards, the amount charged, name on the card, card number, and expiration date must be furnished. Each contribution should clearly show that it is for the "Navy Medicine Bas-relief."

For further information call the Navy Memorial Foundation, Commercial (703) 524-0830.





# MMART Preventive Medicine Assists Venezuela

LCDR Mark T. Wooster, MSC, USN

In mid-November 1989, an epidemic of the mosquito-transmitted viral disease called dengue hemorrhagic fever struck Venezuela. Within a month, there were reported to be over 800 cases with at least 27 fatalities. By the end of the epidemic, the number of cases had risen to 9,523 with 74 deaths. Dengue fever, also known as "breakbone fever," is characterized by an acute high fever of 5-7 days, joint aches, intense headaches, and retro-orbital pains. Recovery may be associated with prolonged fatigue and depression. Under certain conditions, a severe and often fatal hemorrhagic phase occurs.

As the dengue epidemic intensified throughout December 1989, the government of Venezuela specifically requested the assistance of the Navy Disease Vector Ecology and Control Center, Jacksonville, FL (DVECC JAX). The request came through the auspices of the Pan American Health Organization (PAHO) and the U.S. Embassy, Caracas, via the Bureau of Medicine and Surgery, Washington, DC, and the Navy Environmental Health Center, Norfolk, VA. On 28 Dec 1989, DVECC JAX deployed a Mobile Medical Augmentation Readiness Team (MMART), which was augmented with additional personnel

throughout the month of January 1990.

Dengue is spread by the yellow fever mosquito, *Aedes aegypti*, with a human reservoir-mosquito-man cycle. The human incubation period is between 3 and 15 days. The human reservoir is considered infective to mosquitoes from the day before onset of symptoms until the fifth day of the disease. The mosquito becomes infective to humans 8-11 days after a viremic blood meal and remains so for life.(1)

*Aedes aegypti* is a peridomestic mosquito, usually found only in close association with man. Vector popula-

**HM1 William Krothe, preventive medicine technician, adjusts a T-jet nozzle as members of the Venezuelan Ministry of Health look on.**

tions often reach their highest levels in overcrowded urban environments. This mosquito breeds in artificial containers, such as flower pots, water jugs, cisterns, and old tires. The adults rest in the dark recesses of houses, including closets, under beds, behind curtains, and in storage cabinets. *Aedes aegypti* is known to bite throughout the day and sometimes into the night.(2)

Caracas, the major foci of the epidemic, is set in several steep-sided mountain valleys. Many of this city's poorer barrios cling to the steep valley walls with individual houses being accessible only by footpath. These "vertical barrios" often stretch up from the valley floor several hundred feet to the ridge tops. The lack of piped water forces the people to store water in artificial containers, thus facilitating mosquito breeding. Poor sanitation in yards, on roofs, and in fields also contributes to the number of artificial containers that can be utilized by the mosquito vector for oviposition.

The mission of this deployment was to augment Venezuelan public health efforts by controlling mosquitoes in those areas that were inaccessible to truck-mounted sprayers. The goal was to reduce the number of *Aedes aegypti* mosquitoes to levels below which dengue transmission to man does not occur.

The most obvious emergency method needed to address this problem is aerial ultralow-volume (ULV) insecticide spray. ULV indicates that the amount of pesticide used for mosquito control is in the range of only a few fluid ounces per acre. In Venezuela, 3 oz of malathion were applied per acre. This is only  $20 \mu\text{l}/\text{m}^3$ !

Spraying a small amount of pesticide per unit area has obvious environmental advantages; however, the spray's ability to kill mosquitoes is solely dependent on the proper pesticide droplet size being dispersed. If the

droplets are too large, they fall to the ground without impinging on mosquito targets. If they are too small, they vaporize or drift away. With an average droplet size of 50 microns, an aerosol cloud will last less than 15 minutes, and droplets will impinge on most flying insects. If the dispersal equipment is properly calibrated, there should be little or no residual on exposed surfaces once the aerosol cloud has completely dissipated.

Proper meteorological conditions are crucial to the efficacy of ULV operations and severely limit the times when ULV can be effectively applied. To keep the cloud low to the ground, ULV must be applied only during a meteorological condition known as a "thermo-inversion." Under "normal" daytime temperature conditions, the Sun heats the ground surface, which warms the air closest to it. The warm air mass continuously rises from the surface and cools with increasing altitude. Pesticide aerosols applied under these conditions will be carried upward off the target by the rising warm air mass. Under inversion conditions, however, warm air lies over cooler surface air preventing upward diffusion of pesticide aerosols. Cool air will not rise through warm air. This inversion weather phenomenon usually occurs at dawn and dusk and often lasts less than 2 hours. Coincidentally, dawn and dusk are also the times when wind speeds are the most optimum (less than 15 mph) for ULV operations.

The utilization of aerial ULV spray in mountainous urban areas of Venezuela posed many problems. The narrow valley floor of Caracas is studded with high-rise apartments and skyscrapers, in addition to high-tension power lines slung from ridge line to ridge line. In effect, the target spray area was a maze of obstacles requiring a superior degree of flying skills on the part of the pilots. Utilization of fixed-

winged aircraft, such as the U.S. Air Force's C-130 Hercules spray system, was not deemed feasible. It would be extremely dangerous for a C-130 to fly at 230 mph and 150 ft off the ground above the city of Caracas. Additionally, using the U.S. Army's helicopter-mounted, underslung sprayer would have been disadvantageous, because of the chance of the underslung unit being snagged by an obstruction and the chance of accidental tank drop in a populated area.

The Navy's Pesticide Aerial Unit No. 9 (PAU-9) ULV insecticide aerial spray system, however, proved to be ideal for operations in Venezuela. The interior mounted tank and boom can be installed on a wide variety of rotary aircraft by use of Davis tiedowns and/or cargo straps. The PAU-9 system has been used aboard various helicopters, including the H1,(3) HD-1,(4) and H-3 (5) aircraft.

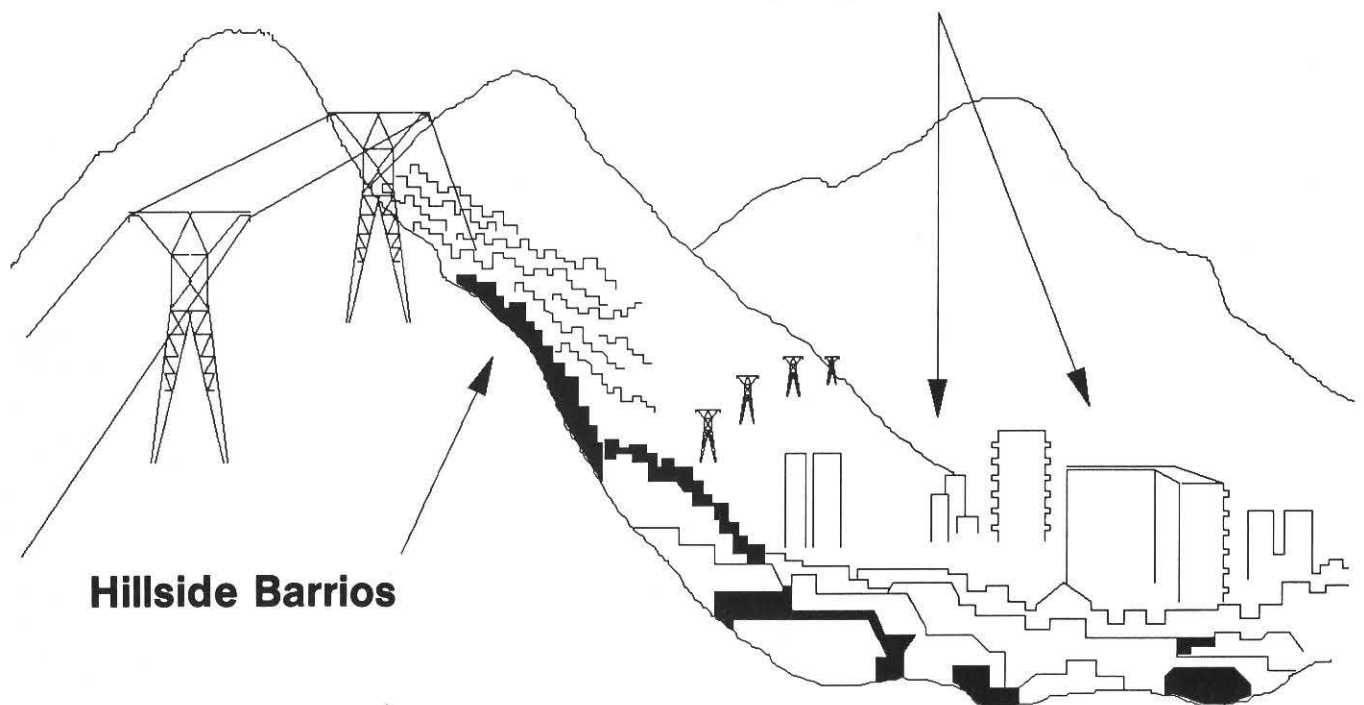
In Venezuela, the system was mounted on board Bell 412, UH-1A, and UH-1B helicopters. The empty tank and cradle assembly of the PAU-9 weighs only 120 pounds and can be easily installed by two individuals. Two models of the PAU-9 system were deployed to Venezuela. The PAU-9A has a boom with 10 8001 T-jet nozzles while the PAU-9B has 1 rotary head nozzle. The PAU-9B was developed to conform to the EPA's label requirements to use a rotary head for malathion when delivered at airspeeds less than 150 mph.

Aerial spray operations began on 1 Jan 1990 using Venezuelan Air Force helicopters and pilots. Almost 73,000 acres and 1,800 gallons of pesticide were sprayed throughout the State of Aragua and the Federal District, which includes the capital city of Caracas. Spray schedules and maintenance requirements necessitated 16-hour workdays, 7 days per week, with over 60 separate missions and 135 flight hours being logged by DVECC JAX



## Power Lines

## High-Rise Structures



## Hillside Barrios

Hillside barrios, power lines, and high-rise structures made the target spray area a maze of obstacles for aerial spray operations.

staff. Their efforts directly contributed to the first reduction in the number of cases since the epidemic started late last year.

In addition to aerial spray operations, a week-long course on aerial spray was offered to members of the Venezuelan Ministry of Health and pilots from various branches of the Venezuelan Armed Forces. The course was designed to provide both theoretical and practical knowledge to aid them in the establishment of their own aerial spray teams.

The MMART was deployed into a situation without any support, relying on their own initiative and resourcefulness to overcome a significant language barrier and many cultural differences. This deployment had very high visibility, as demonstrated by the fact that both Venezuelan President Perez and Health Minister Adrianza accompanied the team on several spray operations.

High media and public interest was

evident with numerous positive press accounts of the U.S. Navy's involvement in dengue control efforts. The U.S. Embassy in Caracas was also pleased because this MMART deployment did much to instill a more positive attitude toward the United States in Venezuela at a time of heightened international tensions due to events in Panama and Colombia.

It is impossible to estimate the number of lives saved and the amount of suffering alleviated, except to state that the number of new cases and deaths reported were drastically reduced by the end of this deployment. However, what impressed PAHO and the Venezuelan Ministry of Health with DVECC JAX was the fact that we did not come to Venezuela solely as consultants to talk about killing mosquitoes—we came to kill mosquitoes. This implication is important as time is of the essence for the containment or reduction of any vector-borne disease epidemic. The operational

nature of DVECC JAX versus the consultant role of most other international agencies makes DVECC JAX a unique international health asset.

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# Deployment to Bahrain:

## An Adventure in Medicine

CDR Uriel R. Limjoco, MC, USNR

**S**heikh Rashid bin Saeed al Maktoum, the late ruler of Dubai dies at 1:00 a.m. and is interred by evening of the same day. A 7-year-old boy undergoes a cholecystectomy and develops a hemolytic crisis as a postoperative complication. A 57-year-old woman complains about a cramping pain of both popliteal areas radiating to her right calf. This pain is accompanied by a severe burning pain on the sole of her right

foot which causes her to sleep with ice packs on the bottom of her foot for months. Consequently, the woman gets her much-needed surgery, a hemorrhoidectomy, that relieves her from her symptoms.

These were some of the problems that confronted us upon our arrival in Bahrain on 12 Aug 1990. Being the first medical unit sent to the region in support of Desert Shield, we rapidly began interfacing with the medical and

surgical staff of the Salmaniya Medical Center, the teaching hospital for the Arabian Gulf University. As part of the combined MMART Teams I and II, our primary objective was to use our military casualties management education and training in aiding the Salmaniya medical and surgical staff. While busily at work alongside our Arab colleagues, we gained a vast amount of Middle Eastern medical and cultural education.



**HM3 Thomas Southard (right), OR tech from Portsmouth, VA, uses his American training to assist medical center surgical residents in one of the operating theaters.**

**HM2 David McCoy, laboratory technician from Portsmouth, VA, demonstrates a procedure he developed that improved the efficiency of legionella and toxoplasma antibody testing. This procedure was employed at the Salmaniya Medical Center.**

The past is alive and thriving in Bahrain. Tradition and culture are vital parts of Bahrainian life. One trip to the A'ali area, central Bahrain region, revealed how current inhabitants have integrated their homes and businesses with the ancient burial mounds of the Dilmun(*I*) people. In fact, some of the mounds have been converted into firing ovens for the crafting of beautiful pottery and other clay products produced in the region. An additional trip to the Bahrain National Museum in Manama provided enlightening historical and traditional information about these centuries-old, over-the-ground burial sites.

Although tradition and culture yield distinctiveness to the region, they often serve as drawbacks when it comes to the delivery of modern health care. Many natives of the Gulf States region practice home remedies and abide by regional medical traditions. One such remedy, which is similar to moxibustion,<sup>(2)</sup> is the application of red hot nail heads on the abdominal skin in order to relieve abdominal pain. Likewise, to relieve jaundice, the fiery nail heads are applied around the ulnar prominences of an ailing person's wrists. Also, in keeping with tradition, a child does not receive treatment before it is 40 days old. There was a case in which a baby had been born with congenital hip dysplasia. The pediatric orthopedist suggested that splints be used within a few days. The family then disappeared with the infant and returned 40 days later for the necessary treatment.

In trying to practice their art, the well-educated, superbly trained, majority British and Canadian medical and surgical consultants are con-



stantly at odds with tradition. This is not unusual where antismoking campaigns, routine mammographies, and self breast examinations are still virtually unheard of in a country where six-lane expressways and five-star hotels abound. Because tradition holds that one should consult a physician solely for ailment, routine physical and medical examinations are rare. Even in the case of an examination, procedures differ. For example, the rectal and pelvic examination are not integral parts of a complete physical examination. In cases where such tests are critical in diagnosing the ailment, patients often refuse to have them. Similarly, if a woman is being examined and carcinoma is evident in one breast, the woman can frankly refuse to have the other breast examined.

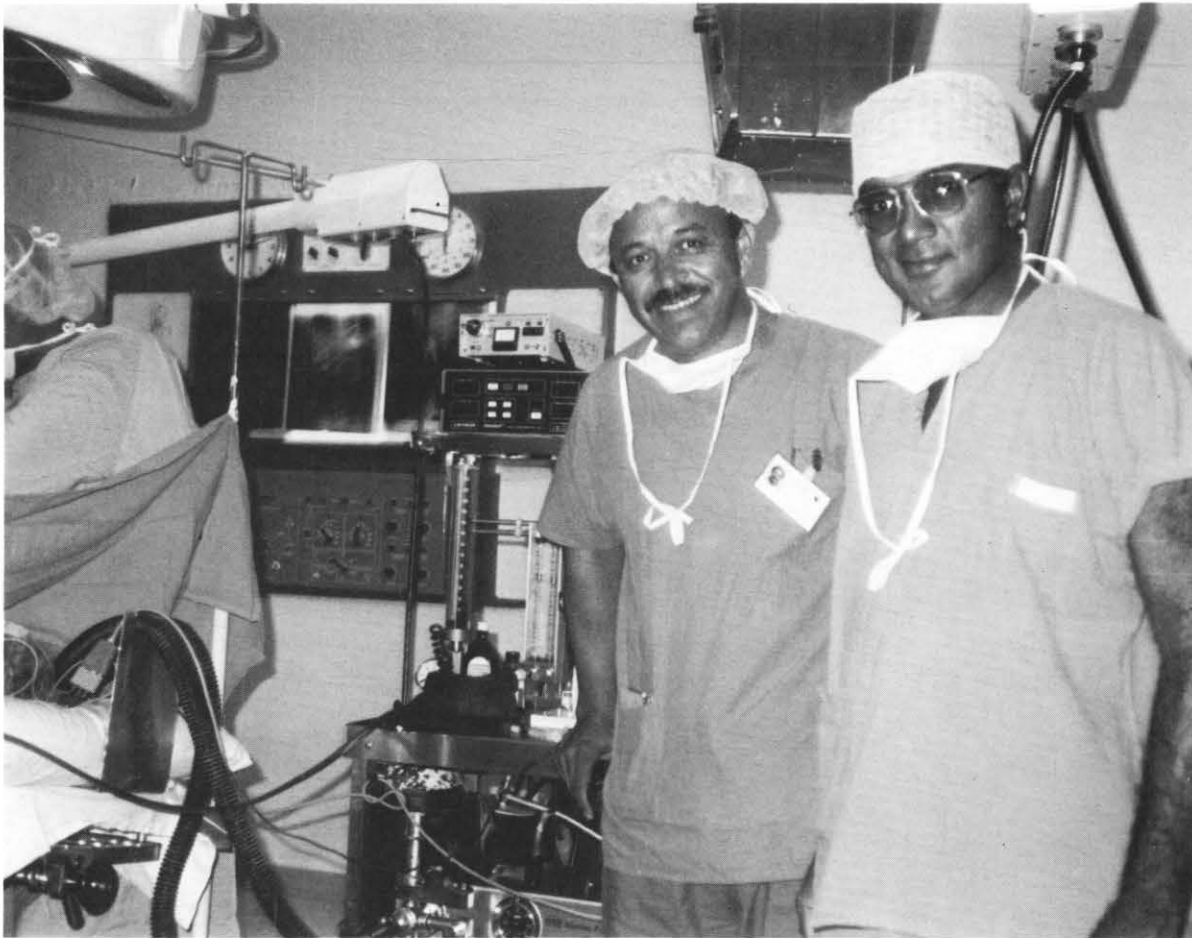
Medical necessity is not always the lone determinant in deciding the duration of a patient's stay in the hospital. Other factors such as the patient's home and family situations, transportation, and convenience to the individual as well as the hospital are included in this decision. One day while making rounds, the chief surgical resident commented about one elderly man's withdrawal status saying that he should be discharged right away because "he is speaking English already."

In the case of death, the body is quickly interred. There are neither provisions for embalming nor for the use of funeral parlors. Generally, autopsies are not conducted. In fact, when there is a postmortem examination, it is for a death that is either trauma related or for one involving medicolegal implications.

Improvements in medical facilities, techniques, and programs are a necessity. For instance, since there are no radiotherapy facilities, patients needing radiotherapy must be transported to Bombay, India, for their treatment. In the past, they were transported to Kuwaiti hospitals. Another example is the organ transplantation program. Although we had a well-trained heart transplantation surgeon on our staff, the program is still in its embryonic stages since more donors are needed for transplants. Presently, transplantation organs such as kidneys come from related donors. However, this is not a problem that is being ignored. Accordingly, in an article published in the 28 Oct 1990 edition of the *Gulf News*, Kamlu Roopani called for "legislation that will allow organs of the deceased to be used for transplantation" in the Gulf States.

There are other notable improvements and advancements. The Burn Unit, for example, can be compared





**CDR-select Jesse Hernandez (left) with anesthesiologist Dr. Reza Mustafa Jokio in one of Salmaniya's operating rooms.**

with the best in the world. Another indication of improvement is the use of first-class equipment for the ultrasonic destruction of kidney stones, a common province of Saudi Arabia)(3) has in the development of gallstones in children with the sickle cell trait.

Any crisis situation deployment is very difficult to accept. The separation from family, friends, and usual work environment lends its toll in the heartache and insecurity one might experience during such deployment. Therefore, we give tribute to our Commanding Officer, CAPT Frederick "Ted" Ludwig, MC, USNR, from Portsmouth Naval Hospital, for exemplifying the quality of leadership that has enabled us to maintain a very high degree of response-readiness and morale. Whether or not we are called upon to carry out our primary objective is undeterminable. But, regardless, our deployment was still worth

the sacrifice in time and effort, for we acquired a treasury of Middle Eastern education and culture.

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When this article was written Dr. Limjoco was Executive Officer, Combined MMART Teams I and II, Manama, Bahrain, and Officer in Charge, Surgical Team I, San Diego, CA.

# Historian Interviews Iraqi Prisoner of War

CAPT M.D. Roberts, MSC, USNR

*CAPT M.D. Roberts is a Navy Reserve Medical Service Corps officer recalled to active duty during the Persian Gulf crisis to record the history of the medical aspects of the conflict. He is a member of the Naval Historical Center Unit NR VTU 0615, and is one of three Navy historians recalled to duty who served in the theater of operations. When he conducted this interview with an Iraqi EPW (enemy prisoner of war) physician on 26 Feb 1991, CAPT Roberts was observing activities at the 1st and 2nd Medical Battalion, 1 FSSG, medical facility at Al Khanjar, Saudi Arabia. The facility, located only 10 miles south of the Iraqi barrier on the Kuwait border, treated the majority of U.S. Marine Corps and Iraqi wounded during the 100-hour ground war. The EPW's name has been deleted to conform with security requirements.*

**CAPT Roberts: Could you give us some background? Where did you train in your country and how did you come into the army?**

At the beginning, my thanks [to the U.S. Navy] for the good behavior with us, our people, and our patients . . .

I was graduated in Mosul City, in Mosul College of Medicine about 1988. I have been a rotator in Mosul hospital for about 2 years. I finished my rotation about August 1990. It was a 2-year rotation in Mosul University. We have a center there for pediatric and general surgery, medicine, ophthalmology; all of these. So, the rotation could be in all of these branches . . . 1 or 2 months, 3 months for major branches. After that, because I had never joined the army, my year group was inducted. In 1964 is my birthday.

So there are a group of doctors who

have graduated since that date who are deployed into the military. We have been in the military about 6 months now. From the start of the crisis until now.

**Since August?**

Since about 1 month after the crisis began. I had been in Baghdad in the Rashid military hospital. Not in the hospital itself but in the center for training of doctors. I spent about 2 months there. And then, we [were given the opportunity] to transfer to any part of the army. So, my [assignment came] down that I would be in Division Force Number 28, Division Force 83, in the center of the army in Kuwait. So, I have a small unit. You have drugs, and you can do simple things.

**Did you have people to work with you?**

I had about eight substaff with me.

**Were they doctors?**

There was one doctor in Basra [Iraq] with me with eight substaff.

**The substaff are not officers. Is that correct?**

They are all soldiers. But they are trained medically.

**Do they go through military schooling or do they come from civilian training in the hospitals?**

The same thing like for me. They are civilian medical staff. But when they enter the military, they go to the military and serve their time in there. Then they get out of it.

**Is eight people an average size unit for a medical unit in the field?**

Our division force unit has three parts, three subdivisions. In each subdivision, we have about an eight-

person medical substaff. When they are treating minor things, they are with a subdivision of about 500 soldiers. When they have cases which are complex or those they can't treat, they transfer the case to me into the center of the force.

**Are there enlisted soldiers that go out with an individual squad, platoon, or company at that level? Would one of the medical soldiers go with a squad of 10 soldiers out into the field?**

If there will be an attack?

**Anytime.**

In the subdivisions there are special places for them. Whenever anyone is injured or becomes sick . . . .

**Would they bring him back?**

Yes, they would transfer him to me if they can't treat him.

**Where do they go after they have been treated at your unit? Do they go to a larger type field hospital?**

Actually, before the war started there were no such complicated cases. Ordinarily, I can manage them; something like the flu, bad eye, chest infection. For the emergency cases, like appendix or something or an injury needing minor operation, I transfer him to a larger unit which contains many doctors.

**Does Iraq have military hospitals or do you utilize the civilian hospitals for treatment of the military wounded or people that become ill in the front lines?**

During the war?

**During war or even in peacetime.**

In peacetime, we have special military hospitals separated from the civilian hospitals. The military doctors are taking care of these people. But

during the war, the civilian hospitals are ready to admit injured people.

**I know that you probably don't have access to this information, but just on a guess, in peacetime about how many military beds could be utilized for your military patients?**

Not once in my life did I go to a military hospital. I worked for about 4 months, very brief. I came from the civilian hospital of Mosul to the military. So, I don't know. But, at the center, the military hospital in Baghdad, the Rashid hospital, is very large and very specialized. Don't forget we had with Iran an 8-year fight. So, we have many, many injured people and we have many specialized doctors, specialized branches also.

**Yes, we hear that there is a well-developed specialty for treatment of orthopedic cases from the Iran-Iraq war since so many people lost limbs in that conflict.**

Yes, that's right. A specialty like that was in Mosul also. But actually whenever they have a complex case, they can bring in civilian specialists or send the patient to them. The specialists will take care of them.

**This may display my ignorance of your culture but are there females in your medical establishments?**

In the military?

**Or in the civilian.**

Yes. We have good nurses and doctors throughout the country.

**Are there any in the military?**

Yes. In the military also. They work with patients, teaching about nursing care.

**Do some of them become doctors as well?**



**Iraqi Aid Station Bunker: Al Burgan Oil Field, Kuwait. Note stretchers in foreground. Area was the site of a major tank battle.**



Even if she becomes the top of the nurse category, [a nurse] can become a doctor at a special college of medicine at Baghdad or at Basra.

**When a person decides to become a doctor, is that your own decision or does someone give you a test at some time during your early schooling and say you should be a doctor and then you go into that program? How did you decide to become a doctor?**

I tell you something. In our country, it is a point of great pride to a family for one of the members of the family to be a doctor. So, if [a student] is clever in school, the first thing, if he has high scores, he's thinking to be a doctor. But, instead of that, you [may] have some that come to the military, others, they go to engineering . . . science . . .

**After you have left your basic schooling and have begun the advanced schooling, how many years of training does it take to become a doctor?**

I was in college 6 years, in our college of medicine. After that you do your 2-year rotation. But before going to medical school, you attend primary school and then secondary school

which is 3 years and then you go to college.

**Is the college training 4 years?**

It depends on the type of college. Let's say engineering college. It takes 4 years; veterinary medicine is 5 years; human science is 4 years. Only the medical college is 6 years. I would like to train in the USA . . . that is my hope.

**What would you want to specialize in if you went to the United States to study?**

In general surgery. I would like to take the American boards in general surgery.

**Since you've been in the army, have you had a lot of opportunity to practice surgery? I don't know what conditions you've been under in terms of being able to treat people.**

As I said to you, because of my location in the division center, I had no facilities to do even minor surgery. I can open abscesses, dress the wound; I can stitch them up, but other things, I must transfer them to a higher unit.

**Have you been located below ground for protection from the con-**

**stant bombing? How did they set up a unit like yours? I assume they wouldn't want to put them in tents on the surface.**

Since we are a medical unit, we are separated from the forces. We are behind the forces. But because of the airplanes and the air bombing there is no chance to be safe. We had a few bombs fall down in our faces.

**Did this frighten you?**

I was treating someone who was injured when I heard the sound of the bombs falling down. We all jumped and were thinking, "We are gone!"

**Were those the big bombers—the B-52s or the smaller jets?**

I think from the first ones.

**It must be very terrible being on the receiving end of all of that. We've been hearing them the last few days, way off in the distance. I can't imagine what that's like up front.**

Well, you are at a distance and you don't know what it feels like. And what's inside Kuwait City is something special. And what is in Iraq is something terrible. The civilian people are in very miserable conditions. They



Interior view of Iraqi Aid Station Bunker; medicine locker, center rear; cot at right.

suffer, and some families, they have no food.

**Coalition forces are trying to be very, very careful not to hit civilian targets. But, of course in every war, even with the best of weapons, it's difficult. We're hoping that the civilian casualties will be very low.**

The aircraft dropping the bombs do not know how to differentiate between civilian and military. And there are the shells which become separated and different . . . .

**The bomblets?**

Yes. They definitely injure many things.

**We're hoping for a speedy end to this war.**

We are here for the first time and I am very surprised at the quality of your [U.S. Navy] colleagues and specialists treating [Iraqi] patients, my people. I am very appreciative to them under the present situation. It is really surprising.

**From a professional standpoint, what have you thought about the way the Al Khanjar field hospital has been**

**laid out? Is this the kind of layout that you would want to have if you were setting up this kind of unit in your army?**

Well, I have not been with any unit like this before in our army. But in our army, we have special cars for special units . . . .

**Ambulances?**

Yes. Like an ambulance. We have an operating theater inside of it, because we have not the facilities to do these things [elsewhere].

**Would you have helicopters to take out the wounded from your unit after you had stabilized the patient?**

In Kuwait, Kuwait City has two military hospitals, so transferring patients there would be faster by car than by [transferring them by] helicopter to Iraq. So we move them by car to Kuwait City.

**After people are treated in Kuwait City, are they taken back to Iraq, to Basra?**

Yes, but not by airplane.

**Just by land?**

Right.

**Thank you very much Doctor. I appreciate your time for this interview.**

Thank you.

**Note**

*The three "subdivisions" to which the doctor referred as being staffed by the eight-man medical support units are probably Iraqi infantry and armored brigades. Although their manning levels varied considerably during the conflict due to desertions and high casualty rates, the 500-man level would be approximately correct for a brigade. It was apparent from the interview and subsequent observations that little or no attempt was made to assign individual medical corpsmen to units smaller than the brigade.*

*It is interesting to note that the doctor, while dressed at the time of his capture as a National Guard officer, was accused by several Iraqi POWs being treated at the Al Khanjar treatment facility of being a Republican Guard medical officer. He was detained after this interview for questioning regarding his role as an officer in the Republican Guard during the period that alleged atrocities were taking place in Kuwait City. □*



# Highlights From the Naval Medical Research and Development Command

Bethesda, MD

## • Technique Delivers High Levels of Antibiotics at the Fracture Site

Combat casualties with severe fractures where skin, muscle, and blood vessels are destroyed standardly are given intravenous antibiotics to prevent infection. Treatment with intravenous antibiotics sometimes fails because damage to the blood vessels prevents adequate amounts of the drug from reaching the wound. Navy-sponsored researchers at the University of Louisville School of Medicine, Louisville, KY, have developed a technique, using antibiotic-containing beads, that has been shown to enhance wound healing and reduce infection following surgical procedures. Strings of 2, 4, or 6 mm beads, each containing 2-8 mg of antibiotics, have been implanted directly into the wound to deliver a local concentration of antibiotic, 20-40 times the level achievable with intravenous therapy. The beads could prove invaluable on the battlefield. When packed into a wound and covered with a temporary adhesive plastic, the beads can help prevent infection for 3-7 days, enough time for injured troops to be transported to hospitals for surgery.

\* \* \*

## • NMRI's Toxicology Detachment Provides Health Hazard Analysis and Risk Assessment

The Naval Medical Research Institute's (NMRI) Toxicology Detachment (TOXDET), Wright-Patterson AFB, OH, has an ongoing program providing health hazard analysis, risk assessment, and safety recommendations to Navy systems commands and fleet commanders on the toxicology of items either currently in use or proposed for use on board ships and submarines. Recently, TOXDET conducted a safety analysis of the shipboard use of bed linens treated with flame retardants. Flame retardant chemicals have the potential for "off-gassing," or releasing potentially harmful materials when heated and/or used in a confined area. There was concern that using this type of bed linen on board submarines might "off-gas" potentially toxic materials (e.g., formaldehyde), which would adversely affect the sailors' health and performance. After extensive review of computer databases and the toxicology research literature, and testing at NASA's White Sands

Test Facility, TOXDET reported that the levels of formaldehyde "off-gassing" was very low. However, because even these low levels of formaldehyde would remain in the sailors' breathing space for an extended period of time, TOXDET recommended that the bed linens be washed before use in order to remove any excess flame retardant. Any concerns on possible toxicological fleet hazards may be directed to TOXDET through contact with the Navy Environmental Health Center, Norfolk, VA (BUMEDINST 6270.8 provides details on obtaining such assistance).

\* \* \*

## • New Insight Into the Mechanisms of Diving-Related Cerebrovascular Disease

Researchers at the Naval Medical Research Institute (NMRI), Bethesda, MD, have gained new insight into the behavior of brain capillary endothelial cells which may help uncover the mechanisms of diving-related cerebrovascular disease. When grown in *in vitro* culture and virally transformed, the cells retained many parent cell properties, including specific antigen markers and the ability to self-organize into capillarylike structures which could be seen stretching between the walls of the culture dish. Surprisingly, however, the transformed cells developed abnormal characteristics that are normally ascribed to macrophage-type cells only. Cloning of the transformed cells verified that all the observed properties were present in each cell and the apparent acquisition of new cellular capabilities was not an artifact of a mixed cell population. These findings indicate that some brain capillary disease processes could involve the induction or expression of macrophagelike behavior in brain capillary endothelial cells and also suggest a hematopoietic and/or phagocytic origin of these cells. Such basic information on cell morphology and function is critical for the development of new treatment for Navy-relevant gas embolisms and cerebral decompression sickness, and also may have implications for the treatment of stroke and other cerebral ischemia diseases experienced in the civilian community.

For additional information on these or other medical R&D projects, contact NMRDC Code 40 at Commercial (301) 295-1468 or Autovon 295-1468.



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