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COVER: One of the most gripping stories to come out of World War II is the account of USS *Franklin* (CV-13). While conducting flight operations off the Japanese coast, a single Japanese bomber turned the carrier into a blazing inferno. LCDR Samuel R. Sherman, MC, USNR, was on the flight deck that day and won the Navy Cross for his heroism. Story on page 4. Photo courtesy National Museum of American Jewish Military History.

Autotransfusion Technique Saves Navy Hospital a Bundle

LCDR Paul Potter hooks up the suction on the Cell Saver III.

WHEN LCDR Paul S. Potter, MC, USNR, became a staff anesthesiologist at Oak Knoll, CA, in 1991, he saved the command $175,000 in 1992 and $173,000 for the first 6 months of 1993. He was able to cut thousands of dollars from his department's budget by revising the autotransfusion system.

Potter was introduced to autotransfusion as a corpsman at Naval Hospital Portsmouth, VA, where he used the Bentley Auto Transfuser. This marked the beginning of an era that revolutionized surgical blood transfusion/autotransfusion practices internationally.

"That was one of the original systems designed during the Vietnam era to salvage blood from wounds and recirculate it to the patient," he said, referring to the Bentley machine. "It had some problems, but this is what I originally trained on."

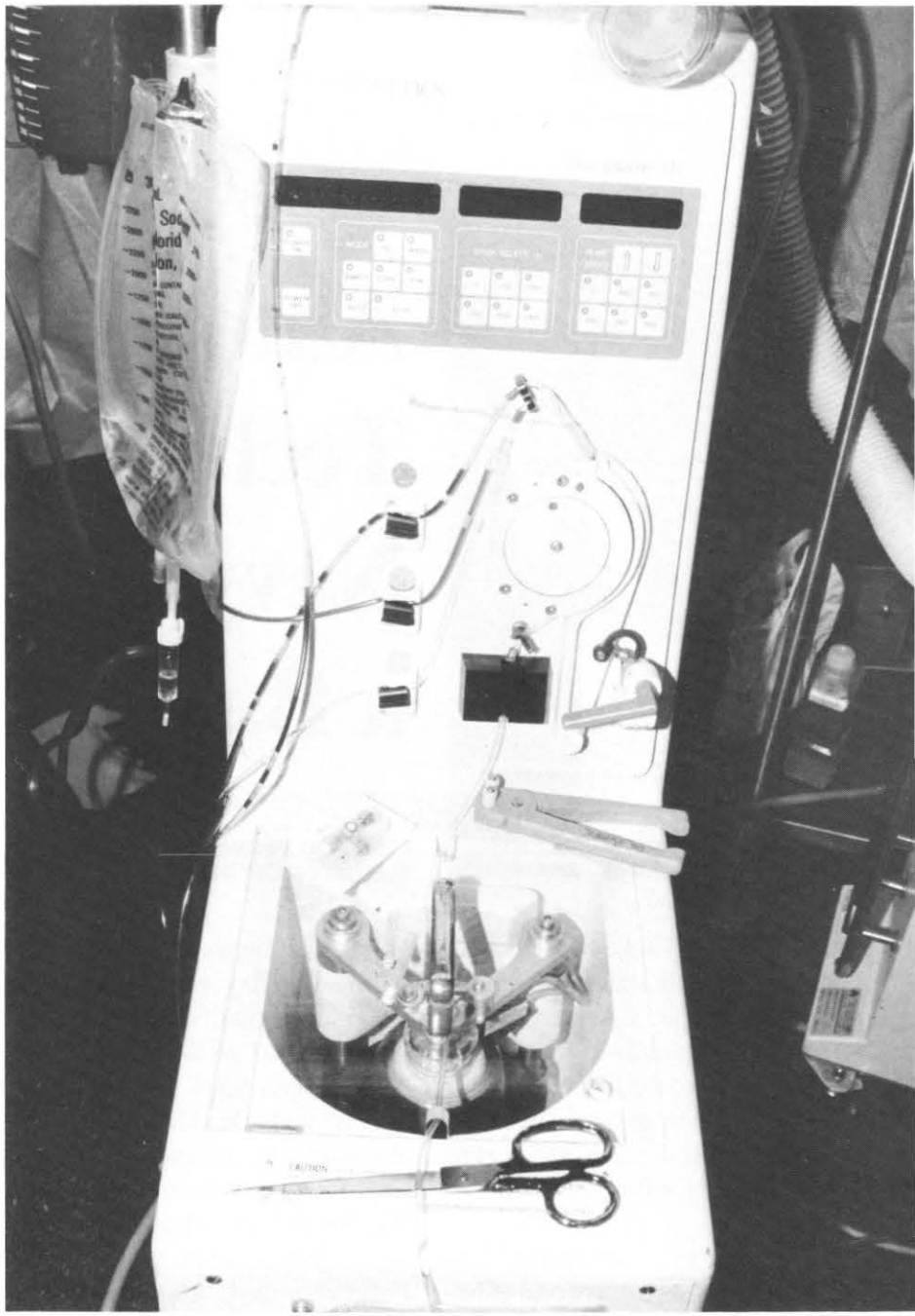
That was 20 years ago. Since then, after getting out of the Navy in 1977, Potter started medical school on a health professional scholarship and worked with Dr. Malcolm Orr, the physician who "invented all these systems." Orr was the chairman of the Anesthesia Department at the University of Texas. Prior to the Bentley, Potter explained, "During surgery, as patients bled, the blood was suctioned and simply thrown away. It could not be reused. This meant an awful lot of waste, so Dr. Orr, myself, and a lot of other people devised a system whereby the blood could be salvaged and transfused back into patients, as needed."

To describe the procedure briefly, Potter said, "We collect the surgical blood in a sterile container; wash out all the fat, bone chips, and debris picked up in the vacuum line during the surgery; clean the red cells and reinfused them back into the patient." Using this method, the autotransfuser operator can give back up to 80 cc's from every 100 cc's of blood lost -- a recovery of 80 percent.

According to LCDR Potter, use of the autotransfusion machine has more than budget-saving significance, however. In terms of disease transmission, the medical implications are far reaching, especially since hepatitis and AIDS came on the scene.

"If you look at statistics for disease transmission from banked blood, there is 1 in 40 to 1 in 100,000 chances of contracting AIDS and 1 in 400 chances for hepatitis and parasitic diseases such as malaria and, now, the dreaded HIV," Potter remarked. He added that the autotransfusion technique -- the ability to pick up the surgical blood during a procedure, filtering it and

Front view of the Cell Saver III.



putting it back into the patient -- has been available nationally since about 1975. "But it wasn't used in anything but major heart cases until the mid-1980's, when HIV came on the stage and scared everybody. According to statistics from 1988, in the United States, 1.8 million units of blood were donated and transfused. Of that, .18 million units were from autotransfused blood. This means that only about 10 percent of blood was self-salvaged. It's projected that by the year 2000, the percentage should be raised to about 35 to 40 percent."

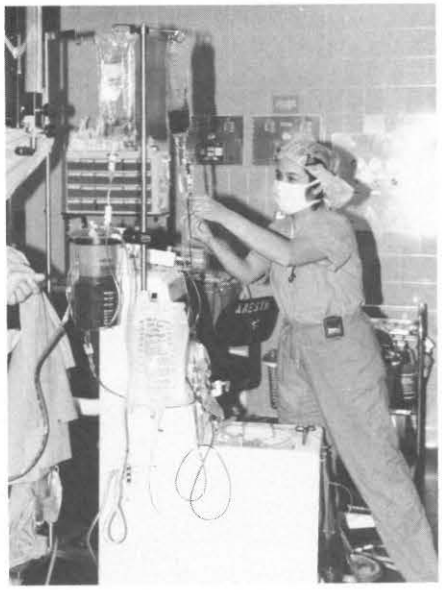
Dr. Potter has been doing his best in this regard since he came to Oak Knoll, first as a resident anesthesiologist in July 1988, then when he took over as director of the autotransfusion service in October 1991. He explained that, while he was a resident, the service was provided by a civilian contract group whom he felt was "sort of plus and minus in their abilities." When he became staff, he decided that he could do the job much more efficiently and at greatly reduced cost to the government. So, he "took over the service, organized it, purchased machines, trained the corpsmen, and started running a technician service."

Potter was quick to point out that the salvage technique is being done throughout the world and that the significance of Oak Knoll's contribution is its prominence in the realm of platelet and plasma salvage. "We've revolutionized that," he said. "Prior to [our intervention], the salvage was undertaken as a reaction to major blood loss. What we've done is take the process one step further.

"We come into the operating room prior to the start of the surgical procedure, hook up our machines, tap into the patient, remove the blood, and separate it into the blood components that are normally obtained from blood banks -- platelets, red cells, serum, and fresh plasma. We store those during the surgery and, as they're needed, we return those blood components to the patient.

"This means that, not only have we cut down the amount of red cells needed because of the bleeding, but now we no longer need platelets or plasma from the blood bank, thus cutting down the risk of disease transmission considerably."

All of this means that, with the dedication of the technicians who are trained on a "strictly voluntary basis," Naval Hospital Oakland's Anesthesiology Department has become a leading authority in autotransfusion. Potter said that, routinely, he gets requests for information on how they run



HN Sandi Lloyd hooks up the system on the Cell Saver III to start the blood-cleaning process.

their service from other military and civilian hospitals.

The service has gained such reputation, in fact, that Potter just left for Guanzhan (formerly Canton), in mainland China, to speak on autotransfusion during a symposium entitled "Current Practices in Anesthesia." This 10-day symposium was organized by Dr. Ray Tom, a San Francisco Navy reservist who runs an organization called "Help and Hands." Tom is chairman of the Anesthesiology Department at St. Francis Hospital in San Francisco.

The Oak Knoll autotransfusion expert made it clear that, in his opinion, dissemination of information on this new technology is very important, and he has some ideas on how to do just that. First, he would like to help establish a military school in autotransfusion. The implications of such a project are unlimited, he explained, given the cost-savings and improved patient care his department has documented during the past year and a half. "Unless we have military personnel trained in the operation of these machines," he said, "If we go to war, the civilians are not going to go with us and we will lose this technology in the field.

"These machines are easily operated . . . we can put them in field hospitals, salvage the blood, thereby greatly reducing the amount of blood that would need to be transported to a war theater. Blood platelets are only good for 5 days," he continued. "If the American Red Cross were to draw a unit of blood from a donor today, separate the platelets out of that blood, it would not be possible to get those platelets to a battlefield in 5 days. But, with the technique developed at Naval Hospital Oakland, we can salvage plasma, we can salvage red cells right in the battlefield situation."

Secondly, Potter was passionate in expressing his conviction that there are no limits to the benefits that can be derived from disseminating the Oak Knoll-developed autotransfusion technology to as many medical institutions as possible. It is very well known in the Bay area medical community where our Oak Knoll-trained autotransfusion technicians are sought after when they leave the Navy. "They filter out in the community," he said. "In fact, the University of California San Francisco not only requires use of state-of-the-art autotransfusion technology, it demands Oak Knoll-trained technicians in their services."

The patient population needs to learn about this revolutionary technique too, Potter concluded, stating that, in accordance with the mandate of the Paul Gann Blood Safety Act, prior to surgery, patients are informed of risks involved and given alternatives to blood transfusion and hemotherapy. The Act became law in the State of California on 1 Jan 1990. "Autotransfusion is one of the options given to surgery patients," he stressed. "Yet the vast majority of the civilian lay population knows nothing about this technology. I think it needs to be widely publicized so that everyone recognizes its value as an option."

At a time when interest in health care reform is intense throughout the nation, the public is ready for good news. Naval Hospital Oakland's pioneering work in autotransfusion is good news, and now is the time to share the knowledge with everyone.

—Story by Andree Marechal-Workman, Public Affairs Office, Naval Hospital, Oakland, CA. Photos by SN Wael Issa.

And the Band Plays On

Dr. Potter's creative energy didn't stop with autotransfusion. Right now, he and his colleagues are developing a promising fibran sealant closure agent called plasma gel. "This is not to be confused with fiber glue from the blood bank," he clarified. "Fiber glue is an FDA-registered trademark. But our plasma gel offers the ability to create watertight closures. This is very important to almost any surgical interventions that are made today because this gel helps to greatly decrease risk of infection, chronic drainage cysts, etc. It is important in major neurosurgery or lumbar laminectomy for dural closure (the covering around the spinal cord or around the brain); it is important to ENT surgery, to vascular surgery to seal the leaking blood vessels. It is also important in urology; for example when we dissect half a kidney." — Andree Marechal-Workman

Naval Imaging Command photos

Interview

Flight Surgeon on the Spot

Aboard USS *Franklin* 19 March 1945

Hours after a Japanese bomber scored two direct hits on USS *Franklin*, the ship is still ablaze and listing dangerously to starboard. At left crewmembers of USS *Santa Fe* watch the action as their vessel stands by to lend assistance.

IN March 1945, as the Pacific war drew closer to the Japanese home islands, the aircraft carrier USS Franklin *(CV-13) was engaged in bombing raids on Japan as part of Task Force 58. Early on the morning of 19 March, as the ship was steaming just 50 miles off the coast, an enemy bomber slipped through the combat air patrol screen and dropped two semi-armor piercing bombs on the ship. Both bombs exploded among a number of armed and fueled aircraft. The resultant explosions and fires claimed the lives of over 800 Navy and Marine personnel and nearly sank the vessel. LCDR Samuel Robert Sherman, MC, USNR, was the flight surgeon aboard the carrier and the only physician on the flight deck after the attack.* Navy Medicine *recently interviewed Dr. Sherman about his World War II experiences.*

I joined the Navy the day after Pearl Harbor. Actually, I had been turned down twice before because I had never been in a ROTC reserve unit. Since I had to work my way through college and medical school, I wasn't able to go to summer camp or the monthly weekend drills. Instead, I needed to work in order to earn the money to pay my tuition. Therefore, I could never join a ROTC unit.

When most of my classmates were called up prior to Pearl Harbor, I felt quite guilty, and I went to see if I could get into the Army unit. They flunked me. Then I went to the Navy recruiting office and they flunked me for two minor reasons. One was because I had my nose broken a half dozen times while I was boxing. The inside of my nose was so obstructed and the septum was so crooked that the Navy didn't think I could breathe well enough. I also had a partial denture because I had lost some front teeth also while boxing.

But the day after Pearl Harbor, I went back to the Navy and they welcomed me with open arms. They told me I had 10 days to close my office and get commissioned. At that time, I went to Treasure Island, CA, for indoctrination. After that, I was sent to Alameda Naval Air Station where I was put in charge of surgery and clinical services. One day the Team Medical Officer burst into the operating room and said, "When are you going to get through with this operation? I answered, "In about a half hour." He said, "Well, you better hurry up because I just got orders for you to go to Pensacola to get flight surgeon's training."

Nothing could have been better because airplanes were the love of my life. In fact, both my wife and I were private pilots and I had my own little airfield and two planes. Since I wasn't allowed to be near the planes at Alameda, I had been after the senior medical officer day and night to get me transferred to flight surgeon's training.

I went to Pensacola in April 1943 for my flight surgeon training and finished up in August. Initially, I was told that I was going to be shipped out from the East Coast. But the Navy changed its mind and sent me back to the West Coast in late 1943 to wait for Air Group 5 at Alameda Naval Air Station.

Air Group 5

Air Group 5 soon arrived, but it took about a year or so of training to get up to snuff. Most of the people in it were veterans from other carriers that went down. Three squadrons formed the nucleus of this air group--a fighter, a bomber, and a torpedo bomber squadron. Later, we were given two Marine squadrons; the remnants of Pappy Boyington's group.*

*MAJ Gregory Boyington, USMC, shot down 28 Japanese aircraft in a 4-month period. That achievement and superb leadership of his squadron won him the Congressional Medal of Honor.

Since the Marine pilots had been land-based, the toughest part of the training was to get them carrier certified. We used the old *Ranger* (CV-4) for take-off and landing training. We took the *Ranger* up and down the coast from San Francisco to San Diego and tried like hell to get these Marines to learn how to make a landing. They had no problem taking off, but they had problems with landings. Luckily, we were close enough to airports so that if they couldn't get on the ship they'd have a place to land. That way, they wouldn't have to go in the drink. Anyhow, we eventually got them all certified. Some of our other pilots trained at Fallon Air Station in Nevada and other West Coast bases. By the time the *Franklin* came in, we had a very well-trained group of people.

I had two Marine squadrons and three Navy squadrons to take care of. The Marines claimed I was a Marine. The Navy guys claimed I was a Navy man. I used to wear two uniforms. When I would go to the Marine ready rooms, I'd put on a Marine uniform and then I'd change quickly and put on my Navy uniform and go to the other one. We had a lot of fun with that. As their physician, I was everything. I had to be a general practitioner with them, but I also was their father, their mother, their spiritual guide, their social director, their psychiatrist, the whole thing. Of course, I was well trained in surgery so I could take care of the various surgical problems. Every once in a while I had to do an appendectomy. I also removed some pilonidal cysts and fixed a few strangulated hernias. Of course, they occasionally got fractures during their training exercises. I took care of everything for them and they considered me their personal physician, every one of them. I was called Dr. Sam and Dr. Sam was their private doctor. No matter what was wrong, I took care of it.

Eventually, the *Franklin* arrived in early 1945. It had been in Bremerton being repaired after it was damaged by a Kamikaze off Leyte in October 1944. In mid-February 1945 we left the West Coast and went to Pearl first and then to Ulithi. By the first week in March, the fleet was ready to sail. It took us about 5 or 6 days to reach the coast of Japan where we began launching aerial attacks on the airbases, ports, and other such targets.

The Attack

Just before dawn on 19 March, 38 of our bombers took off, escorted by about 9 of our fighter planes. The crew of the *Franklin* was getting ready for another strike, so more planes were on the flight deck. All of a sudden, out of nowhere, a Japanese plane slipped through the fighter screen and popped up just in front of the ship. My battle station was right in the middle of the flight deck because I was the flight surgeon and was supposed to take care of anything that might happen during flight operations. I saw the Japanese plane coming in, but there was nothing I could do but stay there and take it. The plane just flew right in and dropped two bombs on our flight deck.

I was blown about 15 feet into the air and tossed against the steel bulkhead of the island. I got up groggily and saw an enormous fire. All those planes that were lined up to take off were fully armed and fueled. The dive

Blazing aviation gas and water pour from the battered carrier *Franklin* as fire fighters heroically work amidst exploding ordnance to save her.

bombers were equipped with this new "Tiny Tim" heavy rocket and they immediately began to explode. Some of the rockets' motors ignited and took off across the flight deck on their own. A lot of us were just ducking those things. It was pandemonium and chaos for hours and hours. We had 126 separate explosions on that ship; and each explosion would pick the ship up and rock it and then turn it around a little bit. Of course, the ship suffered horrendous casualties from the first moment. I lost my glasses and my shoes. I was wearing a kind of moccasin shoes. I didn't have time that morning to put on my flight deck shoes and they just went right off immediately. Regardless, there were hundreds and hundreds of crewmen who needed my attention.

Medical Equipment

Fortunately, I was well prepared from a medical equipment standpoint. From the time we left San Francisco and then stopped at Pearl and then to Ulithi and so forth, I had done what we call disaster planning. Because I had worked in emergency hospital service and trauma centers, I knew what was needed. Therefore, I had a number of big metal containers, approximately the size of garbage cans, bolted down on the flight deck and the hangar deck. These were full of everything that I needed--splints, burn dressings, sterile dressings of all sorts, sterile surgical instruments, medications, plasma, and intravenous solutions other than plasma. The most important supplies were those used for the treatment of burns and fractures, lacerations, and bleeding. In those days the Navy had a special burn dressing which was very effective. It was a gauze impregnated with vaseline and some chemicals that were almost like local anesthetics. In addition to treating burns, I also had to deal with numerous casualties suffering from severe bleeding; I even performed some amputations.

Furthermore, I had a specially equipped coat that was similar to those used by duck hunters, with all the little pouches. In addition to the coat, I had a couple of extra-sized money belts which could hold things. In these I carried my morphine syrettes and other small medical items. Due to careful planning I had no problem whatsoever with supplies.

I immediately looked around to see if I had any corpsmen left. Most of them were already wounded, dead, or had been blown overboard. Some, I was later told, got panicky and jumped overboard. Therefore, I couldn't find any corpsmen, but fortunately I found some of the members of the musical band whom I had trained in first aid. I had also given first-aid training to my air group pilots and some of the crew. The first guy I latched onto was LCDR MacGregor Kilpatrick, the skipper of the fighter squadron. He was an Annapolis graduate and a veteran of the *Lexington* (CV-2) and the *Yorktown* (CV-5) with three Navy Crosses. He stayed with me, helping me take care of the wounded.

I couldn't find any doctors. There were three ship's doctors assigned to the *Franklin,* CDR Francis (Kurt) Smith, LCDR James Fuelling, and LCDR George Fox. I found out later that LCDR Fox was killed in the sick bay by the fires and suffocating smoke. CDR Smith and LCDR Fuelling were trapped below in the warrant officer's wardroom, and it took 12 or 13 hours to get them out. That's where LT Donald Gary got his Medal of Honor for finding an escape route for them and 300 men trapped below. Meanwhile, I had very little medical help.

Finally, a couple of corpsmen who were down below in the hangar deck came up once they recovered from their concussions and shock. Little by little a few of them came up. Originally, the band was my medical help and what pilots I had around.

Evacuation Efforts

I had hundreds and hundreds of patients, obviously more than I could possibly treat. Therefore, the most important thing for me to do was

triage. In other words, separate the serious wounded from the not so serious wounded. We'd arranged for evacuation of the serious ones to the cruiser *Santa Fe* (CL-60) which had a very well-equipped sick bay and was standing by alongside.

LCDR Kilpatrick was instrumental in the evacuations. He helped me organize all of this and we got people to carry the really badly wounded. Some of them had their hips blown off and arms blown off and other sorts of tremendous damage. All together, I think we evacuated some 800 people to the *Santa Fe*. Most of them were wounded and the rest were the air group personnel who were on board.

The orders came that all air group personnel had to go on the *Santa Fe* because they were considered nonexpendable. They had to live to fight again in their airplanes. The ship's company air officer of the *Franklin* came up to LCDR Kilpatrick and myself as we were supervising the evacuation between fighting fires, taking care of the wounded, and so forth.

He said, "You two people get your asses over to the *Santa Fe* as fast as you can." LCDR Kilpatrick, being an Annapolis graduate, knew he had to obey the order, but he argued and argued and argued. But this guy wouldn't take his arguments.

He said, "Get over there. You know better." Then he said to me, "You get over there too."

I said, "Who's going to take care of these people?"

He replied, "We'll manage."

I said, "Nope. All my life I've been trained never to abandon a sick or wounded person. I can't find any doctors and I don't know where they are and I only have a few corpsmen and I can't leave these people."

He said, "You better go because a military order is a military order."

I said, "Well what could happen to me if I don't go?"

He answered, "I could shoot you or I could bring court-martial charges against you."

I said, "Well, take your choice." And I went back to work.

As MacGregor Kilpatrick left he told me, "Sam, you're crazy!"

Getting *Franklin* Under Way

After the Air Group evacuated, I looked at the ship, I looked at the fires, and I felt the explosions. I thought, well, I better say good-bye right now to my family because I never believed that the ship was going to survive. We were just 50 miles off the coast of Japan (about 15 minutes flying time) and dead in the water. The cruiser *Pittsburgh* (CA-72) was trying to get a tow line to us, but it was a difficult job and took hours to accomplish.

Meanwhile, our engineering officers were trying to get the boilers lit off in the engine room. The smoke was so bad that we had to get the *Santa Fe* to give us a whole batch of gas masks. But the masks didn't cover the engineers' eyes. Their eyes became so inflamed from the smoke that they couldn't see to do their work. So, the XO came down and said to me, "Do you know where there are any anesthetic eye drops to put in their eyes so they can tolerate the smoke?"

I said, "Yes, I know where they are." I knew there was a whole stash of them down in the sick bay because I used to have to take foreign bodies out of the eyes of my pilots and some of the crew.

He asked, "Could you go down there (that's about four or five decks below), get it and give it to the engineering officer?"

I replied, "Sure, give me a flashlight and a guide because I may not be able to see my way down there although I used to go down three or four times a day."

I went down and got a whole batch of them. They were in eyedropper bottles and we gave them to these guys. They put them in their eyes and immediately they could tolerate the smoke. That enabled them to get the boilers going.

Aftermath

It was almost 12 or 13 hours before the doctors who were trapped below were rescued. By that time, I had the majority of the wounded taken care of. However, there still were trapped and injured people in various parts of the ship, like the hangar deck, that hadn't been discovered. We spent the next 7 days trying to find them all.

I also helped the chaplains take care of the dead. The burial of the dead was terrible. They were all over the ship. The ships' medical officers put the burial functions on my shoulders. I had to declare them dead, take off their identification, remove, along with the chaplains' help, whatever possessions that hadn't been destroyed on them, and then slide them overboard because we had no way of keeping them. A lot of them were my own Air Group people, pilots and aircrew, and I recognized them even though the bodies were busted up and charred. I think we buried about 832 people in the next 7 days. That was terrible, really terrible to bury that many people.

Going Home

It took us 6 days to reach Ulithi. Actually, by the time we got to Ulithi, we were making 14 knots and had cast off the tow line from the *Pittsburgh*. We had five destroyers assigned to us that kept circling us all the time from the time we left the coast of Japan until we got to Ulithi because we were under constant attack by Japanese bombers. We also had support from two of the new battlecruisers.

Dr. Sherman and a colleague

National Museum of American Jewish Military History

At Ulithi, I got word that a lot of my people in the Air Group who were taken off or picked up in the water, were on a hospital ship that was also in Ulithi. I visited them there and was told that many of the dead in the Air Group were killed in their ready rooms, waiting to take off when the bombs exploded. The Marine squadrons were particularly hard hit, having few survivors. I have a list of dead Marines which makes your heart sink.

The survivors of the Air Group then regrouped on Guam. They requested that I be sent back to them. I also wanted to go with them, so I pleaded my case with the chaplain, the XO, and the skipper. Although the skipper felt I had earned the right to be part of the ship's company, he was willing to send me where I wanted to go. Luckily, I rejoined my Air Group just in time to keep the poor derelicts from getting assigned to another carrier.

The Air Group Commander wanted to make captain so bad, that he volunteered these boys for another carrier. Most of them were veterans of the *Yorktown* and *Lexington* and had seen quite a lot of action. A fair number of them had been blown into the water and many were suffering from the shock of the devastating ordeal. The skipper of the bombing squadron did not think his men were psychologically or physically qualified to go back into combat at that particular time. A hearing was held to determine their combat availability and a flight surgeon was needed to check them over. I assembled the pilots and checked them out and I agreed with the bombing squadron skipper. These men were just not ready to fight yet. Some of them even looked like death warmed over.

The hearing was conducted by ADM Nimitz. He remembered me from Alameda because I pulled him out of the wreckage of his plane when it crashed during a landing approach in 1942. He simply said, "Unless I hear a medical opinion to the contrary to CDR Sherman's, I have to agree with CDR Sherman." He decided that the Air Group should be sent back to the States and rehabilitated as much as possible.

In late April 1945, the Air Group went to Pearl where we briefly reunited with the *Franklin*. They had to make repairs to the ship so it could make the journey to Brooklyn. After a short stay, we continued on to the Alameda. Then the Navy decided to break up the Air Group, so everyone was sent on their individual way. I was given what I wanted--senior medical officer of a carrier--the *Rendova* (CVE-114), which was still outfitting in Portland, OR. But the war ended shortly after we had completed outfitting.

I stayed in the Navy until about Christmas time. I was mustered out in San Francisco at the same place I was commissioned. As far as the Air Group Officer, who said he would either shoot me or court-martial me, well, he didn't shoot me. He talked about the court-martial a lot but everybody in higher rank on the ship thought it was a really bad idea and made him sound like a damned fool. He stopped making the threats.

Dr. Sherman received a Navy Cross in recognition of his bravery on the Franklin. *Upon leaving the Navy, Dr. Sherman resumed his medical practice. He retired about 10 years ago but has kept very busy maintaining a number of official duties in several medical associations. His positions have included: President of the California Medical Association and chairman of numerous committees of the American Medical Association. He has also worked with voluntary health agencies in San Francisco: The Cancer Society, The Heart Association, and The Mental Health Association. Dr. Sherman also helped to institute the regulations of the federal Medicare program. He currently lives with his wife in San Francisco.* --JKH

Risk-Taking:

Analysis and Intervention

James Lark

FASCINATING! How people will take risks! For an advantage or just a thrill, they will challenge chance, flirt with ruin, and try to beat the odds; and they, we, I do it everyday because, as physician and popular author Dr. Melvin Konner comments, risk-taking "is part of being alive."(1)

In the workplace, however, risk-taking, physical risk-taking in particular, has to be more than fascinating: it has to be a vital concern. Working aloft without fall protection, trying to clear jammed machinery by hand with the machinery still energized, adjusting electrical equipment with the power on, hitching a ride on a forklift, neglecting to wear a respirator though exposed to toxic air contaminants, and so on, are all signals that mishap probability has increased, that personal and command well-being may be in jeopardy, and that there are forces playing at cross purposes with total quality and continuous improvement. Conditions demand management attention.

This essay offers a point of departure for that attention and suggests how Navy occupational health providers and safety professionals--the NAVOSH Team--may cooperate to keep on-duty risk-taking in check. The intent is not to take fun out of life, but to cast doubt on certain means for having "fun." The proposed intervention, being based on the principles of leadership and health psychology, is designed to make winners of all concerned.

Behavioral and social scientists who study risk-taking attribute the phenomenon to a variety of personal and social factors. There is little doubt about some of the findings, while other findings are very controversial. The theorists and their findings seem to fall into two categories, and these categories bear a remarkable resemblance to the nature/nurture, organic/functional divisions seen in other behavioral issues.

One representative of the nature/organic camp is David Lykken of the University of Minnesota. Lykken believes

that genetics accounts for a person's tendency to take risks. He has come to this belief by means of a long-term project called "The Minnesota Study of Twins Reared Apart." In this study, Lykken and his colleagues test subjects with the Activity Preference Questionnaire. The subjects are asked what they prefer; for example, sleeping one night on the floor, or asking someone to pay owed money; washing a car, or driving it at 95 miles per hour; arriving at a circus and finding that tickets have been forgotten, or being at the circus when two lions suddenly get loose.

When the subjects are identical twins (raised together or apart), two out of three times the answers are identical. When the subjects are fraternal twins, there is a randomness in the answers that you would see in the general population. These statistics make Lykken believe that genetics has a significant impact on the tendency to take risks.(2)

Another scientist in the nature/organic camp is Marvin Zuckerman of the University of Delaware. He has studied a type of person that he calls "sensation-seeking." To Zuckerman, there is a definite correlation between sensation-seeking and risk-taking. By way of his own "Sensation-Seeking Scale," a valid psychometric test, Zuckerman measures the desire people have for thrills and adventure, for new experiences, and for unconventionality; also their susceptibility to boredom. High scores suggest a person who seeks stimulation. After the test, Zuckerman interviews subjects to see how scores jibe with real life.

Zuckerman reports that high scorers on the scale do favor stimulating behavior in real life, behavior with an unmistakable element of risk. High scorers, says Zuckerman, are people who are very apt to do at least three things: to gamble, to place themselves deliberately in physical danger, and to volunteer for experiments. In addition, Zuckerman comments that, compared to low scorers, high scorers will consume more alcohol, tobacco, and drugs. Their sex lives are more promiscuous and unusual, too.

Zuckerman also reports that high scorers will demonstrate physiological (organic) characteristics that low scorers do not display. High scorers, for instance, generally have relatively *little* of the enzyme monoamine oxidase, high levels of which are associated with psychological depression. High scorers generally have *little* of the enzyme dopamine beta hydroxylase, low levels of which are usually associated with manic states. High scorers generally have a *lot* of gonadal hormones, high levels of which are related to aggressive behavior. Put them together and what do you have? A person who is usually in good spirits, bursting with energy, and obnoxious, to boot. Somebody in the passing lane on the Interstate! Nevertheless, the correlation between the biochemical data and the preference for sensation-seeking and risk-taking is what has led Zuckerman to posit a biochemical, nature/organic basis for the tendency to take risks.(1,3,4,5)

A proponent of the nurture/functional basis for risk-taking behavior is Stephen Lyng, professor of sociology at Virginia Commonwealth University. Lyng "focuses on the relationship between relevant psychological factors and the broader social historical context in which risk-taking occurs."

Agreeing with accepted psychosocial theory, Lyng says that in any society people seek self-fulfillment in work. Fulfilling oneself means enjoying spontaneity, and exercising creativity, skill, and control. But, says Lyng, in our social historical context, work is encumbered with forms, institutions, and roles. People cannot be all they can be. So, he says, they look elsewhere for fulfillment, and find it in contrasting pursuits.

For Lyng, the premier contrasting pursuit is "edgework." He defines edgework as: *the spontaneous, anarchic, impulsive experience of living "on the edge"--on the boundary between order and chaos, control and helplessness, life and death.* Edgework is the antithesis of the status quo.

Edgework may take a number of forms. First and foremost, there is skydiving (Lyng developed his theory by skydiving). There is also rock climbing, aircraft test piloting, and combat soldiering. As Lyng points out, each of these forms demands a highly developed skill and stimulates the sense of acting instinctively, of being in control. Paramount in each form, however, is a clearly observable threat to physical or mental well-being. In a word, there is *risk*

Having gotten to know edgeworkers well, through his own participation in the activity, Lyng says that risk is exactly what attracts edgeworkers. They want to deal with it, to control it, and themselves; and they have this desire, because the status quo just isn't enough.(6)

Three social psychologists who research and write on risk-taking, and who also fall into the nurture/functional category, are Paul Slovic of the University of Oregon, Neil Weinstein of Rutgers University, and William Freudenberg of the University of Wisconsin.

Slovic has commented that people take risks because of social and cultural factors, like the influence brought to bear by family, friends, fellow workers, or respected officials. The social group, says Slovic, can emphasize or downplay risks as a means of maintaining and controlling itself.(7)

Weinstein says he has identified among people an "optimistic bias." When interviewing people about risk-taking, he has heard them claim, in one way or another, that they are less affected by personal risks than are their peers. They are biased, he says, optimistically toward themselves. Underlying the bias, says Weinstein, is everyone's desire to be better than everybody else.(8)

Freudenberg has studied the workers on oil well drilling platforms. He comments that in that kind of environment people take risks because they wish to avoid public embarrassment, or they fear losing their jobs.(9)

Frank Farley of the University of Wisconsin at Madison seems to be in both the organic and the functional camps. There is both "nature" and "nurture" in his thinking. Farley sees risk-taking as a matter of physiological arousal. Each person, he says, has a unique optimal arousal level that is constantly, but unconsciously, sought. According to Farley, some people need a lot of stimulation to reach their optimal arousal level, while others don't need much stimulation at all. Risk-takers, he says, need a lot of stimulation. It's the "tension-raising situations" and the "sensory variability" they experience when taking risks that get them to their optimal arousal levels.

Farley suggests that there is a distinct sensation-seeking, risk-taking personality. He calls it the "type T personality," and the "T" stands for "thrill-seeker." Farley calls type T's high profile people who purposely seek more than a mid-level of stimulation. They are adventurers who seek excitement wherever they can find or create it. They like uncertainty, unpredictability, novelty, variety, complexity, ambiguity, flexibility, low structure, high intensity, and high conflict.

Compared to most people, says Farley, type T's take many more risks; they demonstrate more creativity and extroversion; they prefer experimental art, and they may be unsafe drivers. The personality is most strongly expressed when the individual is from 16 to 24 years old. Farley's type T is Zuckerman's high scorer.

Yet, Farley--also Michael Levenson of the Veterans Administration Outpatient Clinic in Boston--points out an interesting correlation between the kinds of risks a risk-taker takes and the social factors in that person's life; in other words, the *nurture* factors. If a risk-taker has been exposed to, and has absorbed, a positive attitude toward prosocial initiative and originality, that person may well become a hero, like a decorated firefighter or police officer. If, on the other hand, a type T has had antisocial role models, no constructive outlet for all the type T energy, and peer pressure for antisocial behavior, then a drug user may take a place on the street.(10-12)

Levenson includes a distinctive observation in his findings. He reports that he has seen "antistructuralism" in certain risk-takers whom he has studied. These are people who are adequately socialized and who adhere to a rather strict moral code, but who, from time to time, purposely turn their backs on social convention and go, say, to climb rocks.

One other person who has an opinion on why people take risks is Dr. Melvin Konner, who I mentioned earlier. An eclectic thinker, he is not a research scientist; but he is a keen observer of the human condition. I like him, because he cuts through the fog which scientific inquiry often brings to debatable issues. He puts his finger on realities which we all know to be true and which, in the end, science cannot controvert, but can only confirm.

In relation to risk-taking, Dr. Konner has given due credit to people like Zuckerman and the work they have done and the findings they have amassed. But, he has also reminded his readers that we moderns descend from ancestors who became our ancestors (they survived) by instinct, quick reflexes, physical skill, and physical strength--not by ponderous risk assessment. Although evolution has brought us a long way, our instincts, reflexes, skill, and strength derive from those ancestors; and we shouldn't be surprised if occasionally we act impetuously, to see if we still have "the right stuff." Says Dr.Konner, it's the *human* thing to do.(1)

So, physical risk-taking may not happen because of a logical process and conscious decision; and "attitude" may not be a part of it at all. Nevertheless, not every risk taken results in a positive outcome; sometimes the consequences are devastating. Physical risk-taking must be countered. A form of health promotion may be the answer.(13)

At any location, the promotion could start right at the top; that is, the commanding officer of the medical facility could formally express to the responsible line commander (RLC) a desire to support total quality leadership (TQL) in a very practical way. The medical commander could assert that, in concert with base safety professionals, occupational health providers would do their utmost to promote self-protective behavior, as opposed to risk-taking behavior. This offer would be an important contribution to the base-wide *climate* for TQL.

Given that the RLC accepted the offer, occupational health providers would conduct examinations as before; but they would do two other things as well. In the clinic, they would make a point of reinforcing safe behaviors and punctuating their value. Out on base, they would do some practical epidemiology with the local safety professionals.

With the safety practitioners, the health providers would

answer questions like: How well do different shops comply with personal protective equipment requirements or safe operating procedures? Have near-misses or actual mishaps been related to risk-taking? How are workers from the various shops performing on their occupational health physical exams?(14-17)

Then, in the clinic, the health provider would apply that "medical intelligence." With good exam results, the provider might say: "These results are just what they should be" or "You're making good use of your protective equipment" or "All the folks in your shop should be taking such good care of themselves."

The good news and the compliment would be welcome to the examinee. They would confirm the *health belief,* which would probably be motivating the person, that job injury and illness are not inevitable, and that "self-efficacy" is possessed.(18) Good news and compliments would also help the examinee to persevere in the face of scofflaws in the shop. The examinee might even be inspired to set the pace for self-protective behavior.

Of course, poor exam results would also be addressed; and, again, the health provider could put the epidemiologic data to good use. The provider might say: "Do you ever notice the (stressor) even with your protective equipment on?" or "Does your protective equipment fit OK?"

After listening to the examinee's answers, the provider could go on to behavioral questions, asking, in the manner of a "helping relationship,"(19) about safety-related behavior in the shop: "Do people generally protect their (eyes/ears/respiratory tract/extremities)?" "Do you?" "Do people usually use safe operating procedures?" "Do you?" "Is the feeling there that everybody has to get hurt somehow, sometime?" "What do you think?" Answers would furnish points of departure for a discussion of a health-enhancing perspective.

The perspective would be this. While risk-taking may be appropriate during wartime military operations, it is not appropriate during routine industrial operations; there isn't supposed to be war in the workshop. While many personal and social forces may seem to compel risk-taking, the expectation is that it shall not occur because on-the-job risk-taking contradicts total quality and continuous improvement. It's no great accomplishment just to beat the odds, and the epidemiologic data show, objectively, that the odds are not always beaten. It is an accomplishment to make a system, and oneself within the system, do what it should do, every time. Self-efficacy is not only its own reward; it benefits everyone.

I think such health promotion, if consistently and professionally done at a given location, would reduce risk-taking and mishap occurrence. Health promotion, in combination with the management of safety, would not block creative energy; rather, it would open channels for optimal energy flow.

Risk-taking is a part of life. It is impelled by powerful personal and social forces which the individual alone cannot completely control. In Navy workplaces, risk-taking must be a vital concern, because the gamble is with limited resources and mission accomplishment. The NAVOSH Team may counteract risk-taking, intervening with a strategy that blends health promotion and safety management. Although risk-taking should be a vital concern, it is also a challenge to grow: to Navy safety and occupational health professionals, and to the sometimes reckless, but continuously improving, people whom we care for.

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Medicine in the Tropics Course:

Preparing Navy Doctors for Global Medical Challenges

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CAPT H. James Beecham III, MC, USN

WHY Tropical Medicine?

Although doctors educated in the United States receive excellent overall medical training, they are generally unprepared for the medical challenges occurring in other parts of the world, especially tropical environments.* The reason is simple. Many of the diseases present in tropical areas do not exist, or are very rare, in the United States. Test your knowledge of tropical diseases with the following scenario.

A 25-year-old marine has just returned to the United States after a 6-month deployment to Thailand (no other pertinent travel history). He now presents with a 2-day episode of fever, headache, muscle aches, and mild diarrhea. All of the following are possible causes of his illness, except:

a. Malaria
b. Dengue
c. Visceral leishmaniasis
d. Filariasis

The organism shown in Figure 1 is seen on peripheral blood smear. What is your interpretation?

a. Malaria
b. Filariasis
c. Trypanosomiasis
d. Leishmaniasis

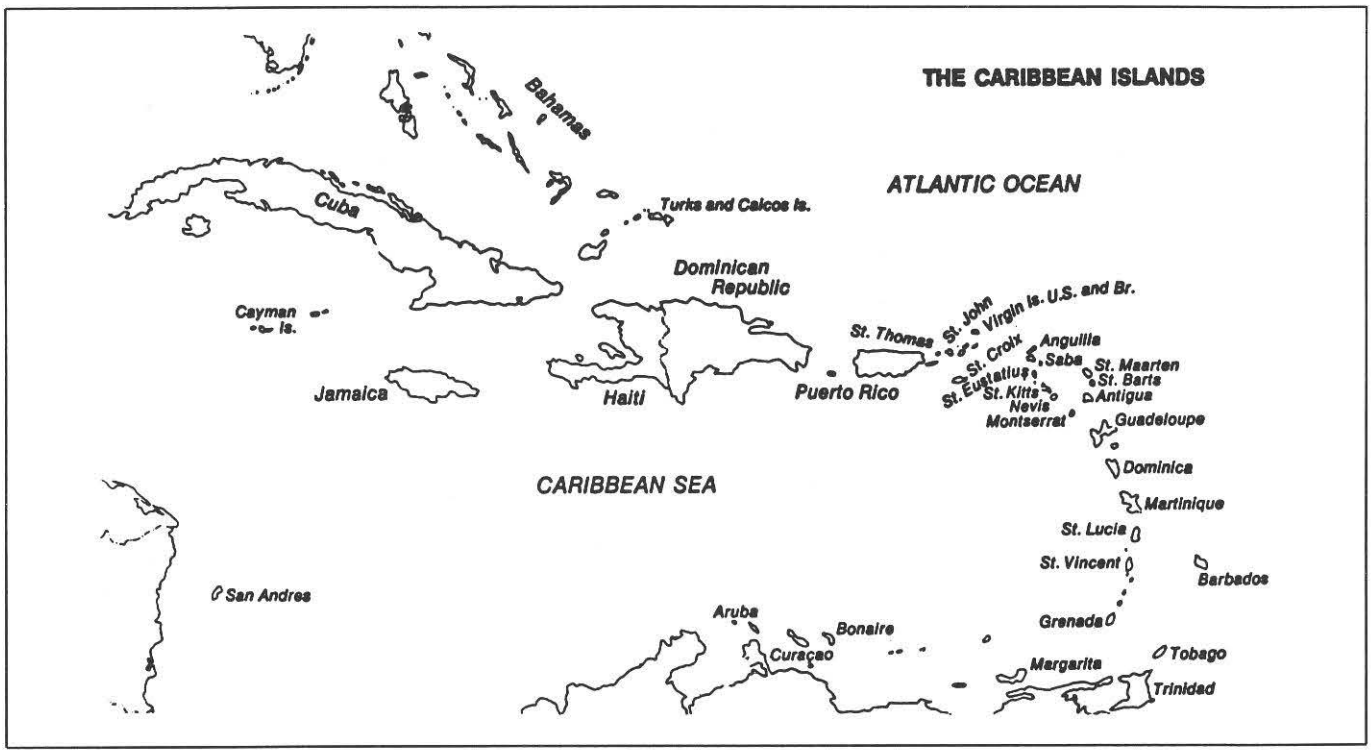
What is the recommended therapy for this infection?

a. Diethylcarbamazine
b. Quinine and doxycycline
c. Chloroquine and primaquine
d. Suramin

(Answers on page 20. Also, see Tropical Medicine Quiz following the article.)

Most physicians in the United States rarely have to deal with patients such as this. Military physicians, however, routinely see persons who travel to all parts of the world. It is therefore essential that they know how to prepare travelers (both individuals and entire military units) for the risks of international travel, and how to evalu-

*The tropics is defined as the area bordering the equator, from 23 1/2 degrees north (the Tropic of Cancer) to 23 1/2 degrees south (the Tropic of Capricorn). Because of perennially warm temperatures and generally high rainfall, the tropics support a large and varied population of animal and insect life, many of which serve as reservoirs or vectors of disease. Additional increased risk of disease is due to the impoverished status of most tropical nations and their subsequent inability to provide safe food and water or to institute disease control measures.



ate the returning traveler with an illness. Lacking this knowledge may not only place individuals at risk of disease but also adversely affect operational readiness. Additional challenges today come from the military's potential involvement in international peacekeeping forces, disaster relief, and refugee care. To meet these challenges, the modern military medical officer must be knowledgeable of global medical issues. The Navy's Medicine in the Tropics course has strived for 23 years to prepare Navy medical officers for the challenges of global medicine.

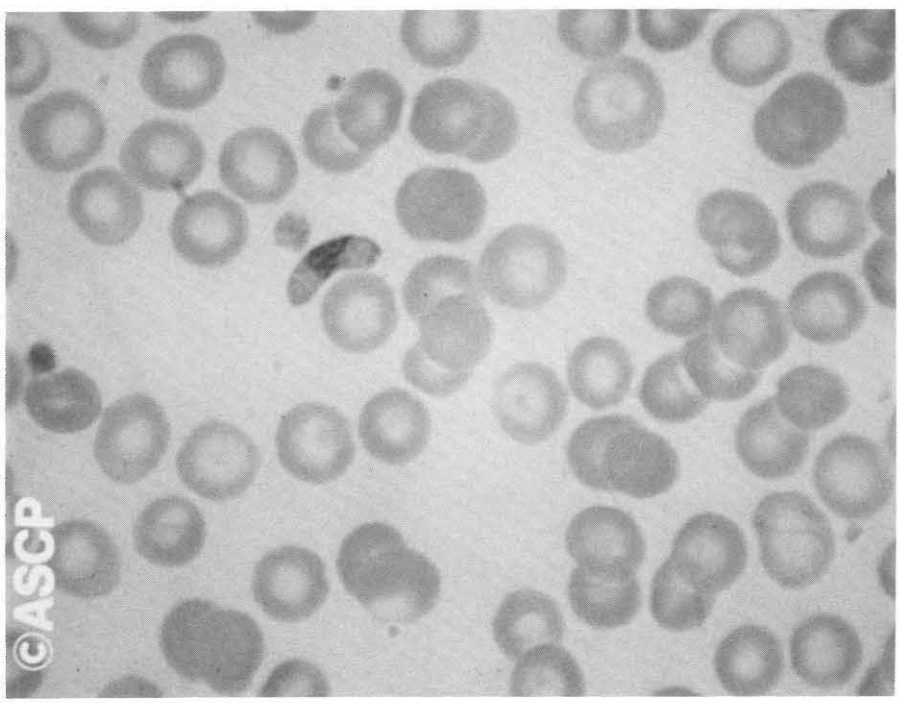


Figure 1. Blood smear of patient with a febrile illness after visiting Thailand. (Reproduced with permission from American Society of Clinical Pathologists)

Origins of Tropical Medicine

The study of tropical diseases began in earnest in the late 1800's as a result of the problems encountered by Europeans as they colonized tropical countries.(*1*) There they encountered numerous infectious disease problems with which they were unfamiliar, generally related to contaminated food and water, animal reservoirs, and flourishing insect and snail vectors--diseases such as malaria, schistosomiasis, filariasis, and trypanosomiasis to name just a few.

Long before the period of colonization there were reports of almost entire crews lost during trading expeditions to the tropics. The risk to life was considered so great that it was initially felt it might not be possible for Europeans to colonize the tropics. An un-

Right: LT David Lane holding the baby he just delivered in a small village near Samana, Dominican Republic. Also pictured is LCDR Rob Gillis (far right) and three Dominican translators.

derstanding of the diseases present there was essential to support the colonial effort.

Two of the early leaders in the field were the British researchers Sir Patrick Manson (referred to as the Father of Tropical Medicine), who first demonstrated the mosquito transmission of filariasis, and Sir Patrick Ross, who first demonstrated the mosquito transmission of malaria. Two of the great names in the early history of tropical medicine in the United States were U.S. Army physicians Walter Reed, who proved the mosquito transmission of yellow fever, and William Gorgas, whose work in controlling yellow fever and malaria in Panama made possible the building of the Panama Canal.

Tropical Medicine and the Military

History has proven time and again the importance of infectious diseases upon the outcome of military campaigns. An infectious disease threat to military operations is defined as any disease capable of influencing the outcome of a battle by producing excess morbidity, mortality, morale disturbance, or resource consumption. Accordingly, the major infectious disease threats of military concern are: (1) diarrheal diseases (2) malaria (3) arboviral diseases (arthropod-borne viral diseases), including dengue, sandfly fever, Japanese encephalitis, and other, (4) acute respiratory infections, and (5) viral hepatitis.(*2*) It is apparent from this list that the major threats come from ingestion of contaminated food and water and from biting insects (primarily mosquitoes). Both of these threats are prevalent in tropical, developing countries.

In U.S. military history, wartime infectious disease casualties and deaths have always outnumbered those incurred on the battlefield. During the American Civil War greater than 25 percent of all fatalities were due to diarrhea and dysentery alone.(*3*) In the Spanish-American War only 243 soldiers died of combat wounds compared to 1,580 who died of typhoid.(*4*) During World War II attack rates of malaria on Guadalcanal reached 1,781 per 1,000 soldiers during part of 1943(*3*) and disrupted U.S. Army operations in North Africa and the Chinese-Burma-India theater.(*5*) When a 10,000-man Marine Corps Expeditionary Force landed in Lebanon in 1958, 30-50 percent of the force was afflicted with diarrhea within several days of the landing.(*3*) Malaria had significant impact on U.S. military forces during the Vietnam conflict, at times rendering entire combat battalions ineffective. And the infectious disease threat remains in effect today. A survey conducted during Operation Desert Shield indicated that over 50 percent of ground troops in theater were experiencing diarrhea, and 20 percent of these missed time from work as a result of their illness.(*6*) And

Long-term effects of leprosy with trauma and wasting of distal extremities due to nerve damage.

as of June 1993, 131 cases of malaria have occurred in U.S. military personnel from operations in Somalia.(7)

The need to understand the disease threats present in areas of military operations and how to prevent and treat them is obvious. If troops deploy to tropical environments without the proper predeployment preparation for the risks there, the battle may be lost before they ever arrive.

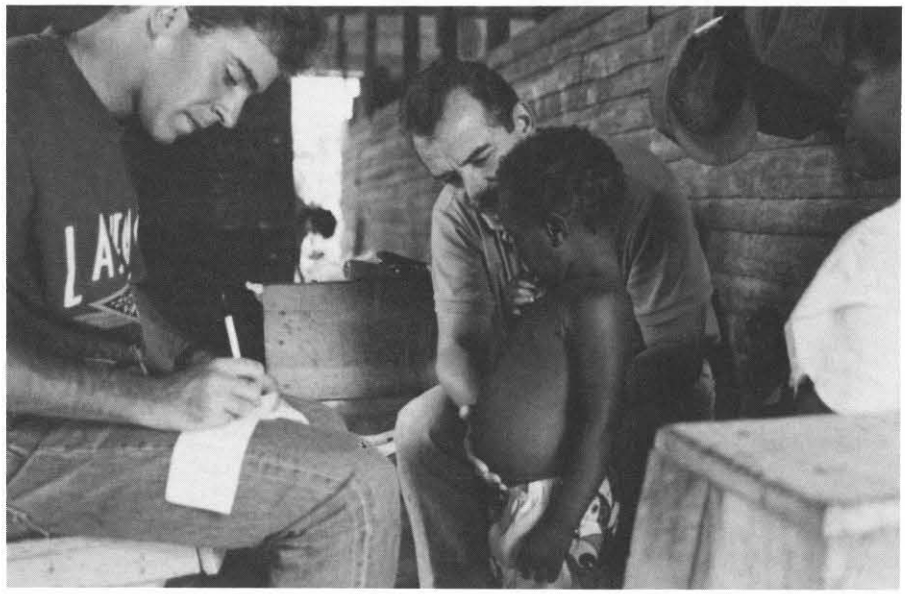
Medicine in the Tropics Course

One of a Kind Program. The Medicine in the Tropics course was begun in Panama at the Gorgas Memorial Lab in 1969 and has continued with minimal interruptions since then. Because of political instability in Panama, the course relocated to San Juan, Puerto Rico, in 1989. From the outset, the philosophy has been to locate the training in the setting of the diseases discussed so that students could have a clinical experience in addition to didactic training. This also allows students to experience the tropical and developing world environments. Although the Army and the Air Force also have tropical medicine courses,* the Navy's course is the only one which offers a practical experience in a tropical country.

The course is 6 weeks long and is held four times per year. Courses begin in early January, April, July, and October. Each class consists of 10 Navy physicians and currently operates out of the Veteran's Administra-

*The Army offers a yearly 6-week tropical medicine course at the Walter Reed Army Institute of Research in Washington, DC, and the Air Force has a 2-week global medicine course offered yearly in San Antonio, TX.

Elephantiasis due to the filarial nematode Wuchereria bancrofti (filariasis).



CDR Larry Garsha (right) evaluates a child with a swollen abdomen near Rio San Juan, Dominican Republic.

tion Hospital in San Juan. Four weeks are spent in the classroom with core lectures in tropical diseases and in the laboratory with microscopic diagnosis of parasitic diseases. The course stresses the diseases of military importance.

In addition to didactic training in tropical diseases there are practical experiences in issues relevant to the military. Several classroom exercises present practical scenarios in military medicine, such as preparing forces for deployment, controlling an infectious disease outbreak on a ship, and evaluating a febrile patient in the field setting.

The Practical Experience--The Heart of the Course. The clinical experience is achieved during a 2-week trip to the Dominican Republic. The Dominican Republic shares the island of Hispaniola with Haiti and is located between Puerto Rico and Cuba. While there the students visit several Dominican hospitals and clinics where they go on rounds with local staff and residents. Diseases commonly seen during rounds include tuberculosis, tetanus, typhoid fever, leptospirosis, malnutrition, meningitis, and HIV disease. Malaria cases are seen occasionally. The visit to the dermatology clinic allows students to see leprosy, cutaneous leishmaniasis, and deep fungal infections. Several patients are usually presented at the filariasis clinic.

The trip to the Dominican Republic is the first time many of the students see severely malnourished children. Although a painful sight, it opens ones eyes to the realities of the world, and few people walk away unchanged.

The class also conducts two 1-day field missions while in the Dominican Republic. These provide the most interesting and memorable experiences for the students. The class visits a poor, rural area and sets up a clinic for the day. Together with a Dominican translator (usually a physician) each student spends the day evaluating and treating persons in the community.

These missions provide students not only the opportunity to see interesting diseases but also to witness the problems associated with living in a developing country--extreme poverty, malnutrition, unsanitary living conditions, lack of waste disposal systems and safe drinking water, widespread intestinal parasite infection, and lack of routine immunizations and health care. Students also experience the difficulties of practicing medicine in a setting in which routine diagnostic tests, medications and supplies, and medical followup are not available--things we take for granted in the United States. These are valuable lessons for military medical officers supporting troops in developing countries.

Although student training is the focus, great effort is made to provide as good medical care as possible under the circumstances. All children under the age of 13 are treated for intestinal helminths, and pregnant and nursing mothers and young children are given vitamins. Vitamin A has proven beneficial in reducing the mortality associated with measles and other infectious diseases in children.(*8*) Skin diseases are prevalent in tropical countries; many people are treated for scabies and fungal infections. Otherwise the focus is on identifying infectious disease problems which can be helped with a short course of antibiotics, such as otitis media or pneumonia in children. Children with diarrhea and dehydration are treated with oral rehydration salts. Chronic medical problems are beyond the capabilities of these missions, and persons with such problems are referred to the local health care system.

Working in the "campos" (rural villages) allows for many interesting experiences for the students. On a recent mission a woman was in labor in a small shack close to where the class was working. Although women routinely give birth there without the aid of a doctor, one of the students, Dr. David Lane (a family practice resident) took the opportunity to deliver the baby in a little different setting than he is accustomed to.

One of the most rewarding aspects

of the work in the Dominican Republic is the interaction with the Dominican physicians who work with us as translators. This interaction gives the students the opportunity to share ideas and experiences with doctors from a different culture--doctors who may have a different point of view than our own of health and sickness, and what to do about it. It is a growing experience for all involved.

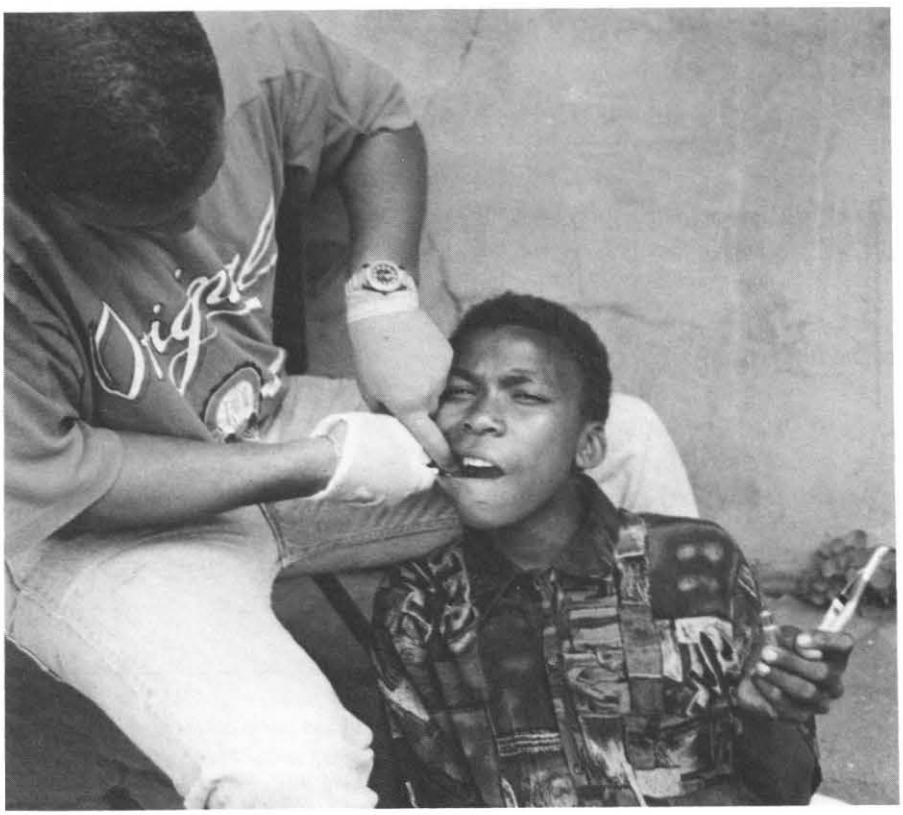
A Unique Learning Experience. Overall, the 6 weeks of the Medicine in the Tropics course attempts to provide a total experience in the health care issues of the tropics, from the organisms of disease to the economic, environmental, social, and political forces which affect health in developing, tropical countries. The primary goal is to prepare the physician for the many and varied challenges he or she may face as a military medical officer. The knowledge gained in the course undoubtedly enhances the medical officer's ability to support operational forces in these environments. But the course has an additional benefit--the personal growth and expanded vision that comes from direct involvement in a part of life and medicine that is new to us, sometimes shockingly so. Such experiences tend to make us better physicians and persons in general.

The Future of Tropical Medicine Training. Interest in short courses in tropical medicine is increasing in both the civilian and military medical community. Recently, the American Society of Tropical Medicine and Hygiene approved a grant to the American Council of Clinical Tropical Medicine and Traveler's Health to fund the process for certification of Tropical Medicine as a medical specialty.(9)

This past November, in concert with the philosophy of force restructuring, the Chairman of the Joint Chiefs of Staff, General Colin Powell, initiated a 3-year, servicewide review of all military training programs (including medical). In addition to looking to cut costs and eliminate duplication of training, this effort is directed at restructuring training programs so that curricula accurately target and match current operational needs.

In response to this directive, an interservice Tropical Medicine Committee was formed and had its first meeting in June 1993 to review current programs and to establish a tri-service plan for tropical medicine training. The outcome of this process on the military's current tropical medicine courses is unknown at present. However, the recent U.S. combat and humanitarian involvement in the Caribbean, the Middle East, and Africa show clearly the operational importance of quality training in tropical medicine.

How to apply for the course. Calls for applications are sent out from the Health Sciences Education and Training Command (HSETC), Bethesda, MD, to all medical facilities two times per year; each call advertises for two courses. Point of contact at HSETC concerning applications is (301) 295-2355. For other information about the course contact the staff in San Juan at (809) 758-7575, ext. 5677; FAX (809) 766-6113. In general, many more persons apply than there are spots available. Preference is given to those who are more likely to use the information in present or future assignments and to those with longer military commitments. To improve your chances of selection it is important that you give as much information as possible concerning these issues.



Dominican dentists perform extractions during the field missions. Badly decayed teeth and severe gum disease are common in rural areas.

Tropical Medicine Quiz

1. Eosinophilia is associated with which of the following parasitic disease? (Choose all that apply)

A. Malaria
B. Schistosomiasis
C. Giardiasis
D. Filariasis

2. Chloroquine-resistant *P. falciparum* malaria is endemic in all of the following countries, *except:*
A. Brazil
B. Haiti
C. Kenya
D. Thailand

3. All of the following protozoa are potential causes of diarrhea, *except:*
A. *Dientamoeba fragilis*
B. *Entamoeba coli*
C. *Cryptosporidium parvum*
D. *Balantidium coli*

4. Parasitic causes of liver or biliary tract disease include: (Choose all that apply)
A. Schistosomiasis
B. Amebiasis
C. Fascioliasis
D. Ascariasis

5. Common causes of splenomegaly in tropical areas include all of the following, *except:*
A. Malaria
B. Visceral leishmaniasis
C. Filariasis
D. Schistosomiasis

6. *P. falciparum* is the only malaria species which has developed resistance to chloroquine. True or false

7. Which of the following cause a "creeping" type of skin eruption? (Choose all that apply)
A. Cutaneous leishmaniasis
B. Cutaneous larva migrans
C. Strongyloidiasis
D. Gnathostomiasis

8. You are called to see a 20-year-old marine at your unit's Battalion Aid Station located near Mogadishu, Somalia. He has been in country for 1 month and now complains of high fever, chills, and headache for less than 1 day. He denies cough, sore throat, abdominal cramps or diarrhea. Which of the following diagnoses should you consider?
A. Malaria
B. Shigellosis
C. Dengue
D. A and C
E. All of the above

Answers

Scenario from page 14: This nonspecific febrile illness in its early stages could be due to any of the diseases listed here except visceral leishmaniasis, which is not present in Thailand. Knowledge of geographic medicine is necessary when evaluating the sick traveler. The crescent-shaped (or banana-shaped) organism in Figure 1 is a gametocyte of *Plasmodium falciparum,* the organism which causes the most serious form of malaria. Failure to recognize this form and begin therapy promptly could result in the patient's death. The correct therapy for this patient is quinine and doxycycline. (Note: The small cell beside the gametocyte is a platelet.)

Tropical Medicine Quiz

1. B,D. Eosinophilia due to infections is caused primarily by tissue-invading helminths (worms), such as schistosomiasis and filariasis. The protozoal diseases malaria and giardiasis do not cause eosinophilia.

2. B.

3. B. All these protozoa are contracted by ingestion of contaminated food or water, a common problem in tropical, developing countries. All may cause a diarrheal illness except *Entamoeba coli,* a commensal organism. Its presence in the stool, however, indicates exposure to contaminated food or water and the possible presence of pathogens.

4. A,B,C,D. The granulomatous response to schistosome eggs in the liver can result in significant impairment due to compression and obstruction. Amebic liver abscess is a potential complication of amebiasis. *Fasciola hepatica* (a liver fluke) and *Ascaris lumbricoides* (the giant round worm) may cause disease due to their presence in the biliary tract.

5. C.

6. False. Chloroquine resistance to *P. falciparum* emerged in the early 1960's and is now present in most parts of the world. Chloroquine resistant *P. vivax* has recently been discovered on the island of New Guinea in the southwest Pacific.

7. B,C,D. "Creeping" or "wandering" types of skin eruptions are often due to the subcutaneous migration of helminths (worms), such as cutaneous larva migrans, strongyloidiasis, and gnathostomiasis.

8. E. This presentation is compatible with all three of the diseases listed (as well as many others), and all are significant threats in Somalia. Shigellosis may present initially as a febrile illness without diarrhea, progressing to significant diarrhea hours to 1 or 2 days later.

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Navy Medicine July-August 1943

Jennifer Mitchum

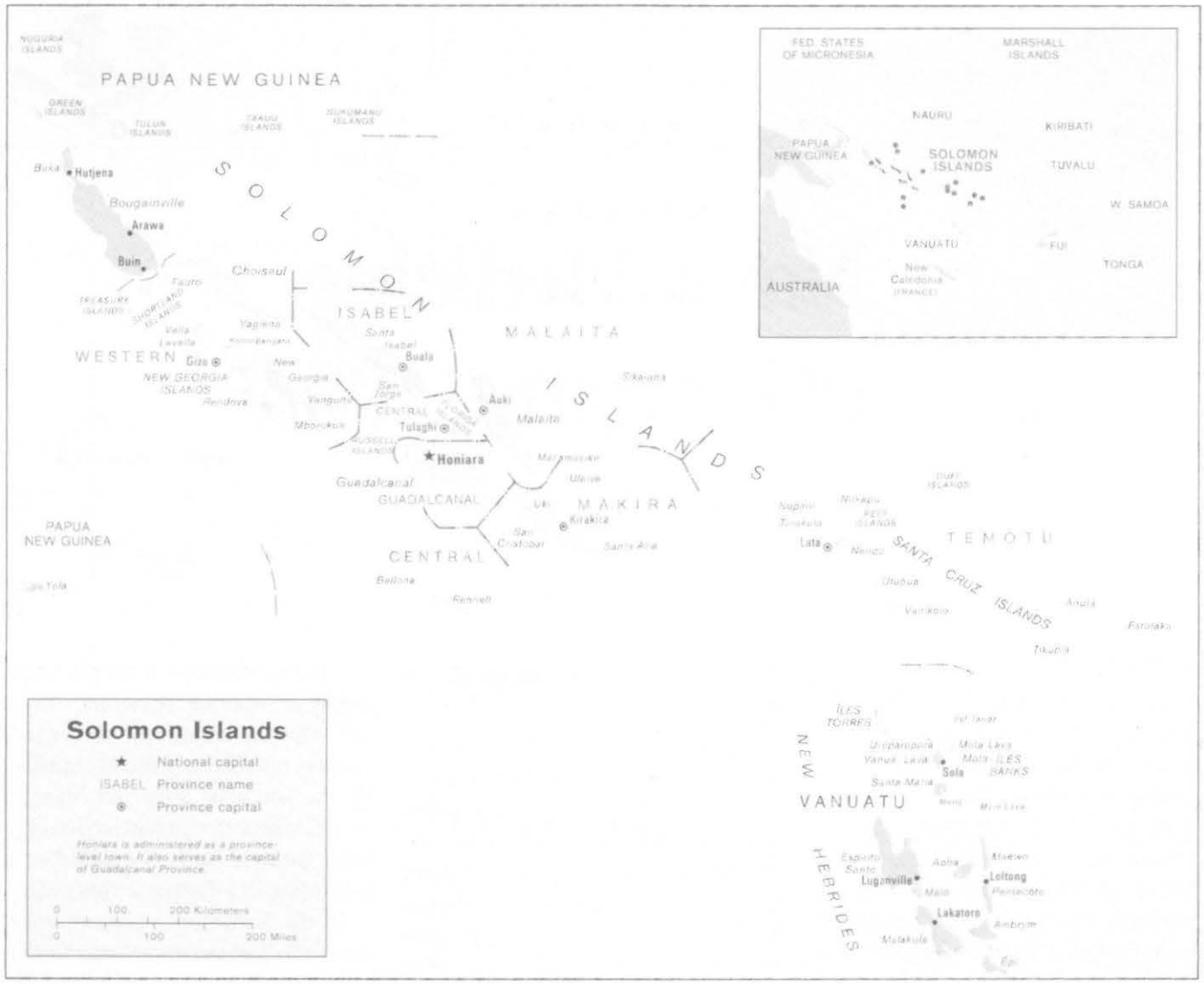
WITH Guadalcanal and the Russell Islands under Allied control, U.S. forces continued their offensive in the western Solomon Islands in the face of enemy opposition. On 2 July, Japanese bombers and fighter planes attacked the camp which Seabees had set up on Rendova Island. Taken by surprise, casualties piled up quickly with 59 killed and 77 wounded. For hours, Navy and Army medics cared for ship and shore wounded. Burying the dead took about 3 days.(*1*) On Independence Day, the enemy launched another aerial attack on the camp destroying several landing craft and damaging two landing craft, infantry (LCI's). Despite the attacks, 28,748 personnel (25,556 Army, 1,547 Navy, and 1,645 Marines) landed and approximately 30,000 tons of equipment were unloaded at Rendova Harbor between 30 June and 31 July.(*2*) After the Independence Day raid, the Japanese Army refused to contribute more planes for the defense of the Solomons. Instead, they concentrated on holding the New Georgia Island mainland as an outpost.

Other Movements in the New Georgia Area

Because the United States wanted Viru Harbor as a small-craft base, U.S. forces landed at Viru Village, New Georgia Island, on 1 July to rendezvous with the arrival of Fourth Marine Raiders coming overland from Segi Point.(*3*) En route to Viru, the Fourth advanced rapidly and front lines were not clearly developed. As a result, snipers and machine guns often operated behind U.S. troops, making first-aid difficult and the setting up of an aid station initially impossible. Later, personnel moved wounded on the trail to Viru at night, and medics set up an aid station in a native hut at Tetamere Village. Corpsmen assigned to the Fourth carried unit 3* medical kits and each battalion member had a supply of Atabrine, halazone, salt tablets, aspirin, band-aids, and a morphine syrette, all in a metal container. To the south of Viru, on Vangunu Island, where troops had landed on 30 June, medical staffers established an aid station in a Japanese mess hall.

In the Viru and Vangunu operations, medical personnel encountered several difficulties. In evacuating casualties over jungle trails, about six men per litter were needed to carry the wounded and the litter bearers had to stop and rest every 300 to 500 yards. Incidentally, many of the seriously wounded died along the way. Because ambulatory patients became litter patients when given morphine, medical personnel administered the drug cautiously. Corpsmen also found the packaging of first-aid units 1 and 3 to be impractical because the units became jumbled after several battle dressings were removed. Often-times, corpsmen had to empty the kits to find specific items. Thus, many corpsmen used Navy pouches in which items could be located more promptly.

*The Unit 3 medical kit was one type of first-aid kit carried by corpsmen in the field. Within the thick purselike bag, which weighed about 10 pounds, were first-aid materials and surgical instruments such as suturing needles, needle holders, surgical knives, tourniquets, and several types of bandages.



Sanitation and Disease in New Georgia

Unsanitary conditions with related fly, mosquito, and screening problems as well as contact with native civilians accounted for combat units losing 25 to 50 percent of their combat efficiency to disease.(*4*) Fungus infections occurred in about 25 percent of the New Georgia Occupation Force.(*5*) These conditions were mainly among Seabee members because the nature of their work made it difficult to maintain good personal hygiene. Thirty percent of the troops had foot infections.(*6*) Early on, diarrhea and dysentery were also problems. During the first 6 weeks of the campaign, 10 percent of the force was affected with diarrhea weekly.(*7*) Medical personnel treated dysentery rather effectively with sulfaguanidine. Because of fewer infected anopheles mosquitoes and improved control measures, malaria was not regarded as a serious problem as it had been during the Guadalcanal campaign. A malaria control unit consisting of two naval officers, eight Navy corpsmen, and one Army enlisted man arrived on Rendova Island 14 July and immediately began surveying and oiling troop areas. Following surveys, troops abandoned areas that showed heavy mosquito breeding. Upon setting up laboratories and diagnosing blood smears, malaria experts found little evidence of initial infection, concluding most of the cases to be relapses or reoccurrences. Atabrine continued to be used as a prophylactic as well as a suppressant.

War neurosis--which included combat fatigue, exhaustion related problems, and temporary mental disturbances--was reported to be the most serious medical problem in the New Georgia campaign. Between 30 June and 30 Sept, about 2,500 were admitted with the diagnosis; 1,750 cases occurred in July, 650 in August, and 100 in September.(*8*) Two hundred of

Photos from BUMED Archives

On a beach in Scoglitti, Sicily, a camouflaged tent serves as a temporary first-aid station for those wounded during the invasion.

these cases were Navy and Marine Corps. Combat fatigue constituted about 50 percent of the war neurosis cases; exhaustion comprised about another 20 percent of the cases. Given proper rest, relaxation, and good diet, 75 to 80 percent of those diagnosed with war neurosis completely recovered.

Hospitalization and Evacuation in New Georgia

With the exception of medical units which accompanied Army, Navy, and Marine forces, area hospital facilities were nonexistent in the initial stages of the campaign. Hospital facilities were not available in the New Georgia area until the Army established the 17th Field Hospital, a 250-bed facility on Kokurana Island, on 28 July. Before then, the nearest hospital was on Guadalcanal, about 200 miles away and 20 hours by boat. Incidentally, because the airfield at Munda was not totally secured by the Allies until later, emergency air evacuation was initially limited. By the time regular air evacuation began, fighting had decreased.

Because of the limited hospital beds, medical personnel evacuated patients within 24 hours of their injuries. Wounded from Wickham Anchorage, Segi, and Viru were evacuated by returning supply boats to the Russell Islands. Similarly, wounded on Vella Lavella, Rendova, and Rice Anchorage and Enogi on New Georgia Island were evacuated to Guadalcanal. Rendova's East Beach served as evacuation port for tank landing ships (LST's) going to Guadalcanal. LST's had the capacity to evacuate between 100 and 200 casualties. During the first 4 weeks of the campaign, one medical officer manned each LST. At a battalion aid station in the vicinity of the beach, medics treated many evacuees for shock prior to their further evacuation. Although the sailing time to Guadalcanal was about 20 hours, casualties, many who had received little first-aid treatment on New Georgia, often reached Guadalcanal medical installations about 72 to 84 hours after they had been injured. Such time gaps and space limitations aboard LST's contributed to the incidence of gas gangrene early on in the campaign. The First Corps Medical Battalion had 24 patients with gas gangrene, of whom 6 died; Mobile Hospital No. 8 admitted 20 patients with gas gangrene, of whom one died.(*9*)

On 15 Aug, SCAT (South Pacific Combat Air Transport) planes landed at Munda Air Field and regular air evacuation began. By the end of August, SCATs had flown out 132 patients.(*10*) During the period of 30 June and 31 Aug, evacuations by all means of transportation totaled 6,693; of these 5,736 were from Army units, 241 from Navy, 716 from the Marine Corps.(*11*)

New Georgia Medical Supplies

Most of the supplies used in the New Georgia operation came from the Army medical supply depot on Guadalcanal. The 43rd Army Division, responsible for medical supplies from 30 June to 28 July, had difficulty carrying out its supply handling and distribution plan. Under the plan, field units were to carry 30 days supply with them and another 30-day supply was to be transferred later. Due to disorganization in unloading and confusion in embarking for combat, personnel carried only small portions of the huge stores. Consequently, units had about 10 days worth of medical supplies instead of 30 days. Within 3 days after landing, more medical supplies were urgently needed. Fortunately, medical units that arrived later brought adequate supplies with them and handled them more efficiently.

Navy medical units secured supplies from Mob-8 which was officially established on Guadalcanal 7 Aug 1943. In cases of emergency, medics used Army supplies. In the beginning of the campaign, Navy medical personnel had scant antimalarial supplies; they later received more when the malaria control unit arrived and when additional supplies arrived from Guadalcanal.

Personnel carry wounded to Kiska, Aleutian Islands, shoreline to be evacuated for medical treatment.

Sicily

Firmly affixed in French North Africa, the Allies moved quickly to take advantage of their gains in the Mediterranean with the next Allied objective being Sicily. The Sicilian campaign began on 10 July with a series of amphibious night landings. The main landing areas were Licata, Gela, and Scoglitti. Forces landing in the immediate vicinity of Licata and Gela encountered strong opposition. However, troops landing on beaches farther away from the cities met little resistance.

On Rendova Island, Navy corpsmen tend wounded at a front line dressing station. Jeeps, seen in the background, serve as ambulances.

In the Scoglitti area, enemy opposition was slight initially but increased as the troops advanced inland.

The Navy Medical Department was to provide medical and surgical care for all personnel on Navy vessels from the time of embarkation until they landed on invasion beaches. Navy medical personnel were also to evacuate sick and wounded from beaches during the assault until adequate shore medical facilities could be established.

In the Licata area, troops landed continuously and thrusted inward despite heavy surf and enemy counterfire. Surprisingly, the losses were initially few. Nonetheless, Navy medical personnel established land-based facilities in the area quickly.

On the day of the initial landings, a Navy medical unit landed and aided survivors. Then on 19 July, another unit arrived at Licata and proceeded overland to Porto Empedocle and set up a dispensary. LST's, which were principal troop lifts, were used for evacuation. Casualties were transported to hospitals in the Tunis-Bizerte area with Army overflow going to medical facilities in Bone.

Gela turned out to be the most bitterly contested landing by the enemy. Beaches were heavily mined against vehicles destroying a number of DUWK's (two-and-a-half-ton, 6x6 amphibious trucks) and bulldozers. As daylight approached, the enemy employed air forces and later tanks. Such resistance, coupled with beach congestion and problems unloading LST's, slowed troop advance in the area. Many paratroopers, tasked with capturing

roads and high ground in which to command the plain, were lost, drowned or shot down. Survivors trickled into Gela. Doctors and pharmacist's mates aboard ships worked nearly around the clock tending wounded. Likewise, a Navy medical unit landed 11 July and set up a small dispensary and sick bay. Despite opposition, the Allied had captured Ponte Olivo airstrip by the morning of 12 July, and the situation became more favorable in the Gela area. Wounded were evacuated to Oran by transports (AP's).

The Scoglitti landings were delayed and once under way heavy surf, lack of definite landmarks, and inexperienced boat crews made landing and unloading difficult. Despite delays, the Navy managed to unload transports and prepare for the evacuation of wounded within 3 days. Army collecting companies and Navy medical components of beach parties rendered first aid to wounded prior to their evacuation to ships.

Transports, attack transports (APA's), and attack cargo ships (AKA's) were used in evacuating patients to medical facilities in North Africa. Landing craft, vehicle and personnel (LCVP's) and landing craft, tank (LCT's) were used to evacuate wounded to the larger ships.

Forty-six LCT's divided into three groups carried a total of three doctors and six pharmacist's mates. Incidentally, the Army found DUWK's especially useful in evacuating wounded from shore-to-ship. The casualty load in the Scoglitti area was reported to be relatively light the first 2 days, allowing medics to render extensive definitive treatment aboard transports.

The third day after the assault troops had landed, 11 of 18 transports sailed from the Scoglitti area and the remainder on the following day. By that time, Army medical facilities were operating ashore. Between H-hour on the day of the landings and arrival in Oran, Scoglitti area transports received 531 Army, 157 Navy and Coast Guard, and 16 POW's for treatment. Transports did not reach their capacity for casualty handling. The average number of casualties per AP and APA was 40 to 45.(*12*) At Oran, some Army and Navy casualties were admitted to area medical facilities while others were evacuated stateside.

Included in the Allied medical element for Sicily were about 15 hospital ships and hospital carriers available for evacuation once transports left; 2 were Army hospital ships and the others were British and Canadian. However, administrative problems hampered their operations. Thus, land-based Army hospitals became overcrowded while awaiting the arrival of hospital ships.

Kiska casualties are transported from USS *Harris* (APA-21) to a landing boat to be evacuated to a temporary hospital at Adak, Ak. Shown are Stokes stretchers, the invention of former Navy Surgeon General Charles F. Stokes, which revolutionized transportation and handling of wounded in that the stretchers acted to immobilize fractures, thus preventing further damage to patients.

In northern Sicily, a Navy medical unit established a dispensary at Palermo. On 28 July, the Naval Operating Base (NOB) Palermo was established. By the end of August, the smaller Navy medical units at Gela, Licata, and Palermo had been consolidated into one unit at the NOB, having a total bed capacity of 125 which could be expanded to 175.

Mediterranean LST Pool

For the first time in the European phase of the war, LST's were thoroughly used. Each LST had a compact sick bay for minor and routine medical concerns and occasional major surgery. There was usually one pharmacist's mate first class aboard each and one medical officer in each division of 4 to 6 ships.

To bolster these facilities, a medical pool of 100 Navy medical officers and 400 corpsmen was set up at the Bizerte embarkation port. The Navy used 52 medical officers and 250 corpsmen; the rest were detailed for duty with the Army. Thus, each outgoing combat-loaded LST carried one medical officer and five enlisted men in addition to the regularly assigned pharmacist's mate. Approximately 72 LST's served the Licata, Gela, and Scoglitti areas. In conjunction with the pool, a medical supply dump was established to ensure that evacuation supplies were constantly circulated to beaches. The U.S. Army Mediterranean base section furnished the supplies.

Each LST had cots for about 150 patients. The largest number evacuated in one ship was about 120. Four hospital corpsmen and one medical officer were sufficient to care for casualties coming aboard, for many ships received less than 12 patients. LST's were especially suitable for evacuating minor casualties over short hauls. Early on, LST's came under criticism because corpsmen and facilities were not being fully utilized.

On 17 Aug, Army troops entered Messina officially ending the Sicily campaign. Lipari and Stromboli Islands, north of Sicily, surrendered to U.S. destroyer and PT boats.

The Aleutians Continued

At 1330 on 15 Aug, Allied troops landed unopposed at Kiska. The Japanese had seized Kiska and Attu in June 1942. U.S. forces had reclaimed Attu in May 1943. The Kiska task unit consisted of an invasion fleet and a small group of men who were to begin setting up a naval station. Because of prior enemy evacuation, the Kiska campaign seemed to be a practice drill for future campaigns. Nonetheless, medical personnel were kept busy.(*13*)

As at Attu, immersion foot and catarrhal fever were primary medical problems; there were also cases of situational neurosis. In addition, injuries resulting from booby traps and accidental wounds, caused primarily by careless handling of equipment, were reported. Medics aboard USS *J. Franklin Bell* handled 32 casualties resulting from booby trap and accidental wound incidents.

Similarly, while on antisubmarine patrol the night of 17-18 Aug, USS *Abner Read*'s stern hit a floating mine. Casualties were taken to the wardroom and the captain's and division commander's cabins for emergency treatment. Those suffering from smoke inhalation were carried below to the CPO quarters or officers' country and given care.

By 0800 of 18 Aug, medics had completed emergency treatment and those wounded were in bunks eating. Subsequently, medical staffers reexamined and classified the wounded according to injuries, rendered definitive treatment, and recorded their conditions. Casualties totalled 48; of these 1 died and 34 were transferred to a Naval dispensary at Adak.(*14*)

Elsewhere

The Navy Medical Department continued its expansion program commissioning U.S. Naval Special Hospital, Sun Valley, ID, on 1 July, USNH Trinidad, British West Indies on 12 Aug, and Mob-10 Russell Islands on 26 Aug. In addition, Base Hospital No. 9 sailed for Oran, Algeria, on 21 Aug.

Worth Mentioning a Second Time

July-August 1943 brought more stories of courage and dedication which reinforced the Navy Medical Department's long medical tradition for service. There is the story of pharmacist's mate Thaddeus Parker who was killed in action during the New Georgia campaign on 20 July. Disregarding his personal safety, PhM2c Parker moved forward into areas swept by intense, hostile fire to render medical aid to two wounded Marines. In an attempt to evacuate the second man, PhM2c Parker was killed. He was awarded the Purple Heart and Silver Star medals posthumously. In addition, a ship, *Thaddeus Parker* (DE-369), was later named after him.

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Naval Medical Research and Development Command Highlights

o Cholera Vaccine Field Trial

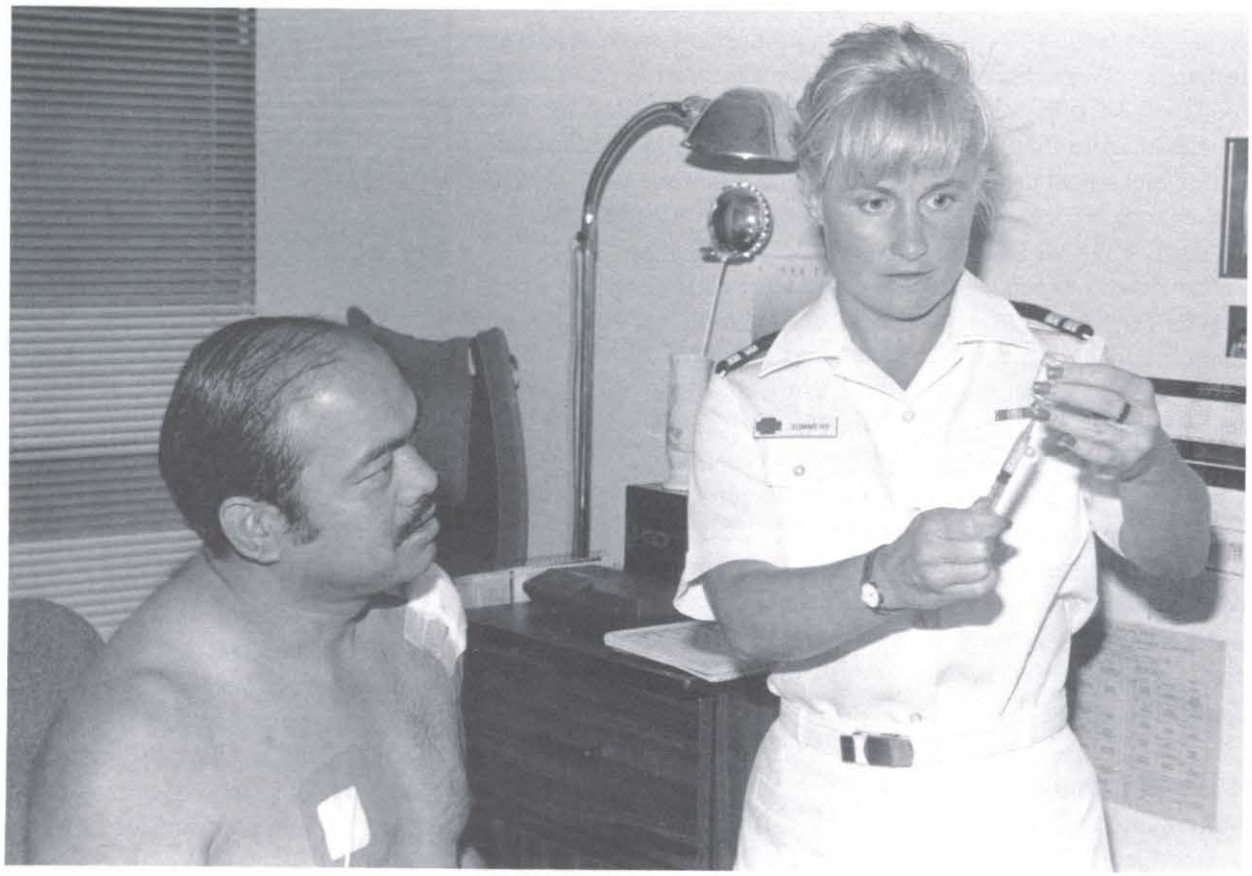
Historically, diarrheal diseases have been a major cause of wartime morbidity in deployed military personnel. Cholera is a severe, dehydrating form of diarrhea caused by *Vibrio cholera.* A safe, effective vaccine against cholera would offer a valuable preventive treatment for troops deployed in developing countries where cholera is endemic, and would be a considerable improvement to the parenteral vaccine currently available. Peru was the first country in South America to be affected by cholera on a large scale in more than a century. Factors of limited sanitation, lack of potable water, lack of access to medical care, and devastating poverty have all compounded the spread of the disease (although the cholera outbreak in Latin America is less than 2 years old, there have been over a half million illness reports, 50,000 hospitalizations, and over 2,000 deaths). Navy researchers at the Naval Medical Research Institute Detachment in Lima, Peru, have started a randomized, controlled field trial of the killed *Vibrio cholera* whole cell plus recombinant B subunit cholera vaccine. This 30-month study, involving 62,000 Peruvians over the age of 2 years, is being conducted in collaboration with Cayetano Heredia University, Lima, Peru, and is funded by the U.S. Army Medical Material Development Activity. For more information contact CDR C.J. Schlagel, MSC, NMRDC Research Area Manager for Infectious Diseases, DSN 295-0881 or Commercial 301-295-0881.

o Molecular and Cellular Mechanisms Regulating Inflammation

Navy personnel engaged in combat or hazardous operations can suffer from traumatic injuries and infections resulting in adult respiratory distress syndrome, multiple organ failure in sepsis, and impaired wound healing. In an effort to develop a therapeutic strategy for controlling the intensity of local inflammation, researchers in the Septic Shock Treatment Program at the Naval Medical Research Institute, Bethesda, MD, are investigating the molecular and cellular mechanisms regulating inflammatory reactions. Using immunofluorescence, immunoelectron microscopy and radioimmunoassay, researchers are studying the effects of cytokines, growth factors, and two known mediators of inflammatory reactions (lipopolysaccharide and thrombin) on the expression of cell adhesion molecules and cytoskeletal reorganization in endothelial cells, monocytes, and macrophages. The objectives of this research are to define the cellular mechanisms that regulate inflammation and to develop a pharmacologic and/or immunologic means for modulating the intensity of inflammation. For more information contact Ms. Christine Eisemann, NMRDC Associate Director for Research Management, DSN 295-0882 or Commercial 301-295-0882.

o Patent Issued on New Membrane-Based Rapid Dot Immunoassay Test Kit

A patent (#5,200,312) was issued recently on a new membrane-based immunoassay and on the method of use which was developed by researchers at the naval Medical Research Institute, Bethesda, MD. The new rapid dot immunoassay test, developed for use in the field, can be easily and quickly performed without the use of special equipment. The kit contains a chemically stable "test strip" comprised of a hydrophobic membrane to detect one or several antigens or antibodies. Known antigens or antibodies which will form complexes with the antigens or antibodies to be assayed are spot filtered with pressure through the membrane. The membrane, either by itself or attached to a base material, is incubated with a test fluid. The resulting antibody-antigen complex is incubated directly or after an intermediate anti-antibody incubation with enzyme conjugated immunoglobulin and exposed to substrate which produces a colored insoluble product if the test target is present. The test kit includes the proper test strip, wetting solution, washing solution, buffer/surfactant solution, buffer solution, enzyme conjugated immunoglobulin solution, and substrate as well as containers for carrying out the dilutions and incubations. For more information contact Mr. A. David Spevack, NNMC Intellectual Property Counsel, DSN 295-6760 or Commercial 301-295-6760.



The author instructs patient on IV self-infusion.

IV Antibiotic Self-Infusion for Active Duty Personnel

LT Kathryn Summers, NC, USN

EARLY patient discharge and home health care are becoming much more essential to the military health care system in our efforts to seriously contain costs (Figure 1). "Experience has shown that selected patients on long-term therapy, who no longer need hospitalization except to receive parenteral antibiotic therapy, can be well managed at home."(*1*)

In the civilian community, there are numerous home health agencies that provide teaching and supervision of patients who have been discharged to home on parenteral therapy. "Outpatient IV antibiotic self-infusion has been used successfully in patients with infections related to the use of medical appliances, pulmonary complications of cystic fibrosis, bacteremia, endocarditis, cellulitis, sinusitis, epi-

glottis, adenitis, bacterial pneumonia, and urinary tract infections including pyelonephritis."(2)

In the military health care setting, dependents and retirees can utilize home health agency IV programs by qualifying for these benefits from the CHAMPUS Health Care Plan. However, active duty personnel in need of long-term parenteral therapy are not eligible for these CHAMPUS benefits; they must remain in acute care inpatient beds for 2 to 8 or more weeks to complete their antibiotic regime.

In January 1990, a target population of active duty patients in need of long-term antibiotic therapy was identified. Of this group, the primary diagnoses included osteomyelitis, cellulitis, wound infections, and endocarditis. A multidisciplinary team was formed to set up an IV Antibiotic Self-Infusion Program for active duty patients at Naval Hospital, San Diego, CA.

Program Development

The multidisciplinary team consisted of (1) infectious disease physician (2) light care RN (3) Orthopedic RN (4) social worker (5) pharmacist (6) Navy Relief nurses, and (7) clinical nursing consultant. The initial planning phase of the program development included the establishment of a patient selection criteria for self-infusion, standardized patient protocol, a policy for pharmacy and supply support, a discharge criteria and followup plan, and the development of a patient teaching plan/competency evaluation.

Light Care and Home Care Phase. The IV Antibiotic Self-Infusion Program was separated into two phases: the Light Care Phase and the Home Care Phase. Patients referred to the program were screened by the Light Care nurse. If the patient met the criteria for self-infusion, then a 24- to 72-hour instruction period was started on the acute care ward. Patients were instructed on the procedures for infusion, medication, use of infusion pump, IV access site care, potential emergency situations and interventions with infusion, and needle disposal.

Once the patient demonstrated comfort and competency with the self-infusion procedure he/she was transferred to the Light Care ward. Competency for self-infusion was measured by a return infusion and a flushing demonstration and an achievement of 90 percent accuracy on a written test. If a patient did not meet the criteria for home infusion, then he/she remained on the Light Care ward for self-infusion for the remainder of the antibiotic course.

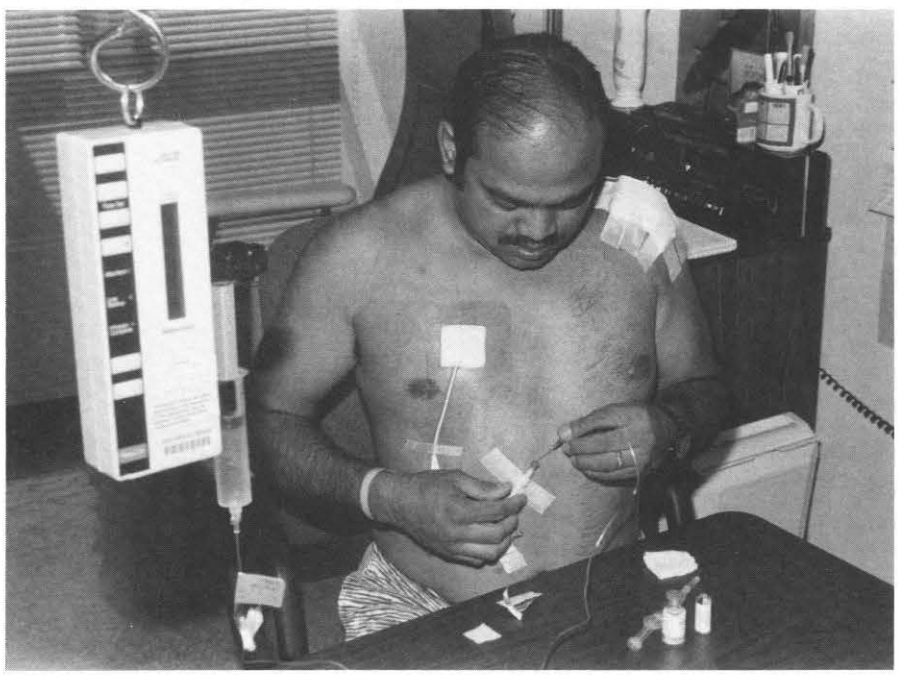
TABLE 1

Factors to Consider in Selecting Active Duty Patients for Home IV Antibiotic Therapy

- Medical stability
- Compliance
- Ability to be educated
- Manual dexterity
- Proximity to the hospital
- Home environment

The Light Care ward is a 25-bed multiservice ward designed to promote patient self-care. Patients are responsible for their own dressing changes and medications. The ward is primarily used for multitrauma patients in need of long-term rehabilitation therapy. Light Care is staffed by one RN and five hospital corpsmen. Some of the primary reasons for Light Care IV self-infusion were that the patients lived in the barracks, on a

Photos by HM1 Daniel Vasil, NSHS San Diego, CA



Patient self-infuses IV antibiotic into Hickman catheter.

ship, or in a home setting that did not have the facilities to support safe patient self-infusion.

If a patient met the criteria for discharge (Table 1) and had safely completed a 48-hour self-infusion on the Light Care ward then he/she qualified for discharge home self-infusion. Patients discharged home to self-infuse would return weekly to the Light Care ward for catheter checks, blood draws, and supplies. In addition, patients that were discharged into the home program are seen once in their home by a Navy Relief nurse to ensure their home setting is conducive to parenteral infusion.

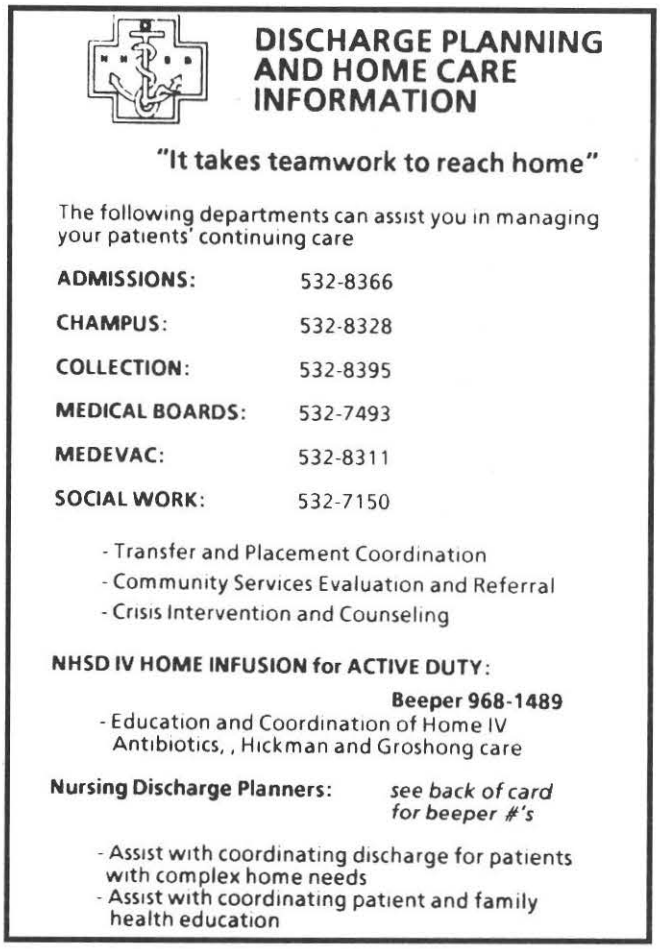


Figure 1

Cost Savings

This program demonstrates a safe and economical alternative to continued hospitalization of active duty patients who require prolonged IV antibiotic therapy. With careful selection of candidates, adequate patient teaching, and home health care support, this level of complex health care can be safely managed at home. All patients who have participated in the self-infusion program at Naval Hospital San Diego have been males between the ages of 28 and 46 years old. The majority, 43 percent, have been diagnosed with osteomyelitis. The remainder of the patients have had varied diagnosis including joint sepsis, endocarditis, and wound infections.

As of 1 Oct 1991, a total of 38 patients had participated in our IV Antibiotic Self-Infusion Program. Of this group, 18 patients met the criteria for home infusion. The average length of their home infusion was 24.7 days, which equaled a total savings of 446 hospital days. The flat rate for a hospital bed is $701 per day. Thus, the total inpatient hospital cost savings was $312,646 for 18 patients. Twenty of the 38 patients did not meet the criteria for home infusion; therefore, these patients self-infused their antibiotics on the Light Care ward. All patients were surveyed for satisfaction at the completion in the Light Care and Home Self-Infusion programs. Ninety-eight percent of the patients were satisfied with both of these self-infusion programs. They responded that the instruction materials and required demonstrations were adequate for safe self-infusion. Only one patient (2 percent) indicated that the hands-on teaching program needs to be briefer and that the instruction materials alone were sufficient for safe self-infusion.

Summary

The self-infusion of IV antibiotics for active duty personnel is a safe and cost-effective means of providing parenteral antibiotic therapy.

The real benefits for both military and civilian health care settings are: (1) increase availability of acute care hospital beds,(2) patient satisfaction and independence, (3) decreased hospital staff work load, and (4) health care cost containment.

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LT Summers is a nurse discharge planner at Naval Hospital, San Diego, CA. This article was written in cooperation with the Clinical Investigation Department, Naval Hospital San Diego.

Navy Medicine Seeks Articles

WHILE many quality articles are submitted to *Navy Medicine,* we are constantly looking for greater diversity. Because Navy medicine is a dynamic, changing institution, we would especially like this journal to provide an opportunity for the free exchange of ideas and opinions. There is no one topic that assures publication, but here are some general topics we would like to see more of:

1. ***Research***--cutting edge research of both a professional/clinical nature. We are also interested in research articles geared to the lay reader.

2. ***History***--historical articles related to Navy medicine.

3. ***Unusual experiences***--first person accounts of current events, such as natural disasters and deployments, i.e., Somalia, Persian Gulf, Hurricane Andrew. Third person accounts are also encouraged as they generally add a broader perspective. Even if these articles are not published, informative pieces will be entered into the BUMED Archives for research purposes.

4. ***The Forum Section***--Thought-provoking editorials and opinions on whatever you feel is important: for example, downsizing--how do current military reductions affect Navy medicine; the future--what does the future portend for Navy medicine (fleet support, dependent care, etc.), and the individual corps.

Professional/Clinical Articles--When writing professional/clinical articles, remember that the aspect of medicine should be unique or particularly relevant to the practice of Navy medicine, i.e., treatment of tropical diseases which afflict Navy personnel during deployments. General medical information that one might encounter in a civilian medical journal is not desirable for our publication.

Editorial Guidelines

Text

Submissions should be typed and doubled-spaced from 1,000 to 2,000 words (two copies). If you use WordPerfect 5.1, submission of a 5 1/4 or 3 1/2-inch disk would also be very helpful. Please be sure to include the full name, rank, and affiliation of author or authors, and a contact telephone number and military address.

Illustrations

Photos should, whenever possible, be 8" x 10" black and white, captioned, and with photographer noted for credit purposes. Quality photography is essential. Snapshot photos, polaroids, or those not properly focused and exposed cannot be used. Exceptional photos related to any aspect of Navy/Marine Corps medical practice are always in demand for cover use. No color slides or large transparencies please.

Tables and figures should be fully marked and camera-ready. References must be properly footnoted, and the manuscript should have a bibliography if outside sources were used. For the proper format, consult a recent copy of *Navy Medicine.*

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The Navy Museum is collecting artifacts, including uniforms, standard issue and personal equipment, for possible use in an exhibit on the U.S. Navy's involvement in Somalia. Having already received items relating to the Seabees, we are most anxious to receive donations from the Navy's medical community. If you can help, please contact Edward Furgol at (202) 433-4882, Naval Historical Center, The Navy Museum, Washington Navy Yard, 901 M Street S.E., Washington, DC 20374-5060.

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Staff and patients of USS Relief (AH-1) in Cuban waters.

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