THE JOURNAL interviews --
LTG Frank F. Ledford, Jr.,
Surgeon General, United States Army

by Ingeborg Sosa

"Using feints, breaches, air assaults, massive armored thrusts and the 'Hail Mary' play in their tactics, US, allied and Arab coalition forces swiftly rolled up Iraq's army and Republican Guard. 'Cut it off--then kill it'. With those words, on 23 January, 1991, Gen. Colin L. Powell, the level-headed and astute chairman of the Joint Chiefs of Staff, summed up the US strategy for defeating the 545,000 man Iraqi army in and near Kuwait." During every war, the Army medical personnel play a very vital role. They must keep as many soldiers as possible as close to the scene of combat as possible and evacuate those too seriously injured to return to battle.

JOURNAL: The Gulf War took place in very unusual terrain--the third largest desert in the world spreading over 1 million square miles, one-third of which is sand with a complete absence of any permanent bodies of water. How did the Medical Department prepare for the deployment of its personnel, equipment and hospitals to this terrain?

LEDFORD: The US Armed Forces, of which the Army Medical Department is a part, have for decades geared their strategic plans and training to be flexible enough to go to any kind of terrain, be it to fight a war, to provide aid in cases of man-made or natural disasters, to deal with terrorist acts or to assist in mercy missions. We were not surprised to have to go to a desert; the overwhelming experience was the massive deployment of over 500,000 soldiers within such a short period of time over such a long distance. In anticipation of a possible conflict in a desert area, we had periodically trained in that part of the world in an exercise called "Operation Bright Star." We, of course, also have desert training areas in the United States, like Fort Irwin in California. It was a tremendous challenge to go 7,000 or 8,000 miles across the oceans to build the largest medical force since WWII, to place 44 hospitals and 24,000 Army medics in the desert. It was an unbelievable exercise in medical

logistics and in mobilization. We had some problems handling all the equipment with so much fine sand and grit around, but we adapted very quickly. As a matter of fact, the Army had spent $2 billion on equipment (DEPMEDS) that it knew would work under any extreme of climate. We were still in the process of fielding the DEPMED equipment when the build-up for SWA started. As a matter of fact, we had about 56 or 58 hospitals out of a planned 100 fielded. It was a major task getting the hospitals, the equipment and the supplies to the combat zone.

JOURNAL: The Assistant Secretary of Defense for Health Affairs, Enrique Mendez, recently stated "Strategic planning for Desert Storm clearly began years ago." What specific preparations and training did the Medical Department develop to prepare its medical people for modern combat?

LEDFORD: This is an all-encompassing question that covers everything we do. The Army Medical Department is indeed well prepared to cope with any contingency, but we are never as well prepared as we would like to be. Every health care worker has to go on field exercises, we have numerous courses run by the Academy of Health Sciences to prepare our people for practicing medicine in a combat environment. We have regular continuing medical education conferences that emphasize combat medicine. All our physicians are trained in Advanced Trauma Life Support, and our dentists received training to be able to assist in providing emergency medical care. We have continuously honed our combat medical skills.

In the area of research and development, we have tried to find new treatments and vaccines to deal with injuries incurred through modern weapons and tropical diseases. Although we have presented training courses on decontamination and medical treatment for biological and chemical injuries for many years, we were prepared to send out teams to enable all our people to brush up on their knowledge. This was very critical, since the threat of chemical and biological attacks was a very real one.

Since we had been forward deployed in Europe, we had POMCUS stores there which enabled us to ship some of the DEPMEDS to Saudi Arabia earlier than we could from the United States, and the MEDSOM unit in Europe was so well stocked with medical supplies that we could get the first shipments off almost as soon as the first hospitals were deployed.

This massive deployment was indeed very difficult and stressful, but it allowed us to test the theories and plans which before had been only paper drills. It gave us the chance to see which of our areas need to be fine-tuned and improved upon. But overall I would say that we were prepared to take care effectively of a large number of casualties.

JOURNAL: A recent report stated that one of the most important medical vulnerabilities involved the preparations for biological and chemical warfare. Intelligence assessments focused on the likelihood that Iraq had built weapons containing anthrax and botulin toxins, either of which "could have created enormous

numbers of fatalities." It went on to say "there were no fielded systems to detect covert attacks until late in the war, and the troops would have received no warning until after medical symptoms appeared--too late to be of best value." How were the troops protected against possible chemical and biological attacks? How well were health care workers prepared to deal with chemical and biological warfare? What special preparations were made to deal with large numbers of this type of casualties? What preparations have been made for possible future incidents?

LEDFORD: We had an enemy that we were pretty sure had several biological and chemical agents--and we knew from experience that that enemy would not shrink from using these agents against us. Chemical and biological agents like anthrax, botulin and mustard nerve gas can cripple whole units almost instantaneously. The US Army Institute of Chemical Defense at Aberdeen Proving Ground, MD, had prepared for such an eventuality for decades. They had developed several new products and excellent training courses which they put on the road in August 1990 to provide all health care workers with sufficient knowledge and skills to deal with casualties. Soldiers, who had been trained to wear their protective masks in the field, were now trained to wear them over longer periods of time. In August 1990, only 5% of our physicians and physician assistants had graduated from the Institute's five-day chemical casualties course. By January 1991, when Desert Storm began, 95% had completed the course. These teams of professionals went throughout SWA training Army, Air Force and Navy doctors, nurses and enlisted personnel in the management of chemical casualties.

Of course, we were also able to use new medications and vaccines developed for some of the agents. One of the antibiological agents was the anthrax vaccine. We had already contracted with pharmaceutical firms to have this vaccine mass-produced. Diazepam auto-injectors were dispensed to all deployed soldiers to protect against nerve-agent-induced convulsions. The pyridostigmine bromide (PB) tablets were used to enhance to efficacy of the nerve agent antidotes. As soon as we started mobilizing, a committee of health care workers met in Washington to develop plans for protecting our soldiers from environmental, chemical and biological agent injuries. We pooled all our resources and knowledge and were well prepared for possible large numbers of casualties.

All our hospitals were specially prepared to treat casualties. The medical center in Landstuhl, Germany was on alert to take in contaminated casualties on a continuous basis. We were lucky that our need for these plans and medications in regard to chemical and biological attacks was not realized, but we learned much from the situation.

JOURNAL: General Ledford, you said that Army medical units in Southwest Asia treated about 22,000 inpatients and 140,000 outpatients, including more than 800 enemy prisoners of war. What were the most frequent types of injuries treated?

LEDFORD: Orthopedic injuries and problems were probably the most frequently seen casualties on the side of the coalition forces. With thousands of young, lively, energetic men and women in the war zone, we had to expect athletic injuries, injuries from car accidents and from putting up tents and moving heavy equipment. We also experienced some low-grade gastroenteric disease and some loss through dehydration, but morbidity was dramatically low. We evacuated a few cases of heat exhaustion, but there were no deaths attributable to this cause. We had 353 Americans wounded in action, and treated over 800 Iraqi prisoners of war once the ground war started. Considering that predictions for killed in action ran as high as 30,000, we must be grateful that the worst-case scenario never came to bear.

JOURNAL: What preparations were made to deliver burn care in support of Operation Desert Storm?

LEDFORD: Very extensive preparations were made to provide the latest state-of-the-art in burn care, and we involved both Europe and the United States, the military as well civilian institutions. In the United States, we lined up hundreds of burn beds in civilian hospitals and burn centers. The Veteran's Administration guaranteed us 25,000 beds that would be available within a few days after notification. The German Surgeon General, Lt Gen Gunther Desch, offered us the use of all the burn beds in Germany. The US Army Institute of Research deployed three burn teams to Saudi Arabia. We specially trained physicians to deal with burn casualties, and we created a 34-bed burn ward at Landstuhl where patients were to be stabilized before evacuation to the States. We also had plans to significantly enlarge our burn center at San Antonio four-fold. Although we were very lucky that this war did not generate the number of burn cases that were predicted, we were prepared to treat large numbers of burn victims.

JOURNAL: Preventive medicine played a very important role in the preparations for medical care in Southwest Asia. How did the overall disease and non-battle injury rates compare to those of some of the other wars during this century like Vietnam, Korea, World War I and World War II.

LEDFORD: The disease and non-battle injury rates were the lowest ever--only one-half of those in Vietnam, one-quarter of those in Korea and one-fifth of those in World War II. The medical personnel that deployed to SWA received some last-minute refresher courses on some of the more exotic diseases endemic to that area such as leishmaniasis, malaria, shistosomiasis, hemorraghic fever, typhoid, cholera and dysentery. The enforcement of preventive measures really paid off. Early on, a number of people came down with food-borne diseases because they ate from unauthorized food sources, but we managed to return these soldiers back to duty after rest and treatment. Of course, preventive medicine people, sanitary engineers and veterinarians were among the first people to arrive in SWA to ensure safe food

supplies to feed 500,000 troops and ample supplies of pure water, to build sanitary facilities and to initiate proper measures to cope with local sanitary problems like the construction of latrines.

JOURNAL: One of the new innovations that could really be tested during this war were the Deployable Medical Systems (DEPMEDS). DEPMEDS were developed during the '80s to replace the Vietnam-era Medical Unit, Self-contained Transportable (MUST) hospitals. In 1990, at the 10th In Process Review (IPR) of DEPMEDS, held at Fort Detrick, MD, about 80 Army activity representatives concluded that there were pressing readiness issues for the DEPMEDS program in the form of shortages of equipment and of trained, skilled soldiers. What sets DEPMEDS apart from previous Army hospitals? Are they the hospitals of the future? Were the major problems mentioned above resolved when combat started? What are the major advantages of the DEPMEDS?

LEDFORD: Clearly the DEPMEDS is the hospital of the future, and we have proven during Desert Shield/Storm that it works. Having had the opportunity to put it to the test in a real war scenario, we were able to note its shortcomings.

The project to replace the old MUST hospitals with DEPMEDS began in 1984, and is a $1.9 billion effort to equip all DoD medical units with up-to-date equipment and supplies. What sets DEPMEDS apart from previous Army hospitals is its modular, standardized design and inclusion in one package of all equipment required to operate a hospital. The biggest problem we have with the DEPMEDS is that they are heavy and difficult to transport. We did a lot of tailoring; we learned that we can reconfigure the DEPMEDS into smaller, more mobile packages that could leap-frog behind the front lines where they were needed. We made sure to keep the surgical capabilities of the hospitals intact. In all, we had 35 DEPMEDS hospitals and nine fixed facilities in SWA by the beginning of the ground war providing 11,000 of the 18,000 beds that were set as a minimum requirement in view of the casualty projections.

Since we were only about half done with fielding the DEPMEDS when the massive deployment to the Gulf region was announced, we had a monumental task ahead of us getting the hospitals equipped and ready for shipment. We had purposely never issued certain medical technological equipment to the DEPMEDS, since medical technology changes so quickly. We have always attempted to give our soldiers the best in medical care--using the latest technological advances is part of it. Many medical and pharmaceutical products have a very short shelf-life, and can only be delivered when required. Our logistical people did a magnificent job getting all the supplies and materials matched up with the DEPMEDS, either in the States or in Saudi Arabia.

One of the lessons learned from Desert Shield/Storm is that physicians, both active duty and reserve, need better training in the DEPMEDS environment.

I can definitely say that the DEPMEDS are the hospitals of the future. The ISO shelters worked well and kept out most of

the fine sand. The cooling and heating equipment, once in place, worked efficiently. We were short some equipment, and we could not provide every surgeon with his favorite suture, but we could field the new mobile x-ray machines, and the new liquid oxygen system, which had been tested during a field exercise in Germany. If we use the lessons learned in regard to the DEPMEDS and its equipment to modify and adjust some of the DEPMEDS concepts, we will have the most efficient combat hospital ever devised.

JOURNAL: Another observation made by the Pentagon was the supposed "life-threatening" shortage of hospital beds. During the deployment and build-up, at a time when the US Central Command specified a requirement for 7,350 hospital beds in the war theater, there were never more than 2,642. How did the Medical Department plan to deal with the projected 33,000 casualties?

LEDFORD: I must state very emphatically that the newspapers took these figures totally out of context and misinterpreted them. Shortly after the beginning of Desert Storm, the hospital beds started to flow into the theater and were there in almost exactly the number and at the time that the CINC wanted them there. The Commander-in-Chief made the decision not to use the precious air space to transport hospitals and beds before he had the soldiers and their weaponry in SWA. The Air Force and Navy had medical capabilities to treat the soldiers already in theater very early on. Originally, US Central Command specified a requirement for 13,500 beds. After President Bush and the top echelons began discussing an offensive plan, the casualty projection of 33,000 called for 18,100 hospital beds. Two days before the air war started, there were 7680 beds available, and by mid-February, the required 18,100 beds were in place. By the time the ground war started, the Army had 13,500 beds for casualties. First, we must understand that the figure of 33,000 was based on a worst-case scenario. Of course, this computer-generated figure might indeed have become a reality, but we must think in a practical way--13,500 beds is plenty of beds to support 33,000 casualties. This point is so important that I want to stress it once more. We do not generate those 33,000 casualties in one day. We had designed a continuum of care in which a few thousand beds could support a whole theater of soldiers. The beds are filled up with patients over a period of time as the casualties occur. They are only filled up temporarily to treat and stabilize patients until they can be air-evacuated to the closest medical center. The bottom line is--a decision was made not to start the ground war until all the required bed space was available. When we went into the ground war, we had the beds, the staff, the supplies and equipment that could have supported a reasonable number of casualties.

JOURNAL: During military conflicts, blood transfusions are primary treatment requirements for the majority of the combat casualties. Did you have a strategic plan to increase the

supplies to, and have sufficient stores in, Southwest Asia?

LEDFORD: We had prepared for such a contingency for years in regard to developing methods of being able to provide blood for large numbers of casualties. We had tens of thousands of units of blood available, and if anything, we could be accused of wasting blood, since luckily, the war was over before we had a large number of casualties. With the assistance of Col Anthony Polk, MS, the Director for the Armed Services Blood Program at OTSG, we had made sound strategic plans well in advance. We already had frozen blood depots in Saudi Arabia and the refrigeration capability to keep up with storing frozen blood as it came in. This is the first conflict in which we used frozen blood, which can be stored for 20 years or more. The amount of blood that we had in the theater at any time was linked to the size of the force present in SWA. We know that in the future we have to train more technicians to reconvert the frozen into liquid blood, but overall, our blood program certainly showed the benefits that can be gained by years of research.

JOURNAL: In combat, speed can make the difference between life and death when dealing with trauma cases. What preparations were made for treating casualties as quickly as possible and for evacuating the more severely injured casualties?

LEDFORD: We once again adhered to our doctrine of "far forward care." We used our tried and true "echelons of care" system. Aid and clearing stations were placed as far up front as possible, and the MASH hospitals were just a little distance behind. The larger combat support hospitals and evacuation hospitals were in the rear. Sometimes some of our medics moved even ahead of the troops. We had a mixture of ground and air evacuation capabilities. We had one and one-half times as many medevac helicopters as we had at the height of the Vietnam War. I must complement the unit of 12 medevac helicopters from Nellingen, Germany, that self-deployed over 3000 nautical miles to Saudi Arabia to assist in the evacuation of patients to the Navy hospital ships.

JOURNAL: During peacetime, the Dental Corps attempts to get all soldiers to a Class I dental readiness to be prepared for deployment at a moments notice. How far was this standard achieved?

LEDFORD: The active force was in very good dental health. The Reserves were not in such good shape since more than 20% required dental work before they could be deployed. This meant that we treated around 30,000 soldiers in our mobilization stations. Only a handful of soldiers could not be deployed because of dental problems. As a matter of fact, the dentists remained some of the busiest professionals in the desert region, since dental problems are not necessarily combat related.

JOURNAL: Supplies were a touch-and-go issue. Was the logistical

support system able to have enough of the right medications and equipment in the right place at the right time?

LEDFORD: Early on during Desert Shield, we did not have everything in the right place at the right time, and everyone knows that. But we had a firm plan on how to get all equipment and supply to the Gulf Area, and the logisticians followed this plan step by step. They went from zero base and built up one of the largest logistical operations in history. Now, there were some shortages, and there was the problem that we could not give everyone the equipment that they were accustomed to. But after we had five MEDSOMS settled in Saudi Arabia, we managed to get the supply and equipment situation up to par. We were lucky in that we had large stocks already in the MEDSOM in Germany in anticipation of a contingency with the Warsaw Pact countries. Here, as with the DEPMEDS, the big problem was transportation. The Army ended up being the logistician for the whole theater--in other words, for the Army, Air Force and Navy.

One of the biggest problems in the theater was communication. Units had problems contacting their medical depots to request supplies. We intend to do better in this area in the future. One of the systems that did work was the TAMMIS automation system that speeded up the ordering of supplies.

JOURNAL: Psychological shock and combat stress caused large numbers of casualties during previous conflicts. How do Desert Shield and Desert Storm compare? What preparations were made to raise the level of endurance in individual soldiers?

LEDFORD: The AMEDD has learned much about treating combat fatigue from previous conflicts and from our allies. Three OM mental health teams deployed early in the operation to help manage psychological patients quickly to help return them to duty as soon as possible and to help prevent more serious emotional problems from arising. Psychiatrists, psychologists, social workers and psychiatric nurses, in coordination with chaplains and JAG officers, were available to counsel those who requested help. One of the OM teams alone briefed more than 800 company-sized units on the importance of early recognition and treatment of the symptoms of combat stress. Many units were briefed as they arrived in country and as they were preparing to return afterwards. Ninety-five percent of the patients were returned to duty within three days. The Army continues to provide counseling for active duty troops and their families.

JOURNAL: A recent editorial stated, "if Desert Storm proved anything, it proved the need for the medical reserves." How many reservists did you call up, and what role did they play in support of this combat?

LEDFORD: This is an absolutely true statement. We could never have provided the support for our soldiers without a very heavy reliance on our reserve assets, especially considering our efforts to provide a continuity of care in our CONUS and European

hospitals. As you know, about 75% of AMEDD assets are in our reserve component. The Army alone called up about 26,000 reservists in nearly every healthcare specialty from anesthesiologists to veterinarians. They served in CONUS helping care for family members and augmenting staffs to receive casualties, they served in Europe doing the same, and many were deployed to SWA for combat support. With few exceptions, they served with professionalism and dedication although many had to suffer enormous personal and financial hardships. Many of our reservists brought invaluable skills from their distinguished civilian careers with them. We had less than 200 requests for release from active duty. That's less than 1% of those we called. Only one physician has been charged and convicted for desertion. Even before they were called, we had over 1700 volunteers, many of them inactivated reservists, who called us about helping when and where they were needed.

JOURNAL: A great number of health care workers were enrolled in a volunteer program to offer their services to their country. Could they be effectively utilized?

LEDFORD: The response to our call for volunteers in the early days of the operation before the reserve could be called up was truly heartwarming. I knew our medical personnel had a long history of always helping whenever they were asked, but I never expected the overwhelming response that we got. The phones rang off their hooks night and day. In the first few weeks, more than 1700 retired and reserve healthcare workers volunteered to come back on active duty temporarily with 757 actually reporting for duty in CONUS facilities. They were trained people who we already knew to be competent soldiers and professionals, and I will always be grateful for their selfless contributions to the AMEDD.

JOURNAL: This conflict proved that the three services can work well together. Was this true also for the medical personnel?

LEDFORD: Interservice cooperation was superb throughout the operation. We helped each other in many instances. Army medevac helicopters transported sick and injured soldiers to Navy ships from which they were evacuated on Air Force planes to facilities in Europe and in CONUS. The Army handled medical logistics for all services. Healthcare providers treated each other's service members without regard to uniforms. Researchers and other support workers at home worked together to solve common problems that all services faced.

JOURNAL: How did you evaluate the help given by the allied and the Arab coalition forces?

LEDFORD: The Saudis were generous in allowing us to use many of their fixed facilities which, incidentally, are absolutely state-of-the-art. Nine of the 44 Army hospitals deployed to SWA were in Saudi host nation facilities. Some of our allied

partners also sent medical support not only for their own formes but they were willing to treat American soldiers as well if need be. The German Surgeon General, Dr. Gunther Desch, offered us any of their medical supplies and equipment.

JOURNAL: The importance of the medical care provided to the soldier's family whilst he is away fighting for his country must never be underestimated. How did the Army Medical Department manage to ensure that there was no degradation of health care when the overall task was already so monumental?

LEDFORD: It wasn't easy but with the help of our reservists and volunteers we did a reasonably good job. This was important not only in fairness to our troops and their families, but it was also important in trying to contain increasingly escalating CHAMPUS costs. We are under constant Congressional watch about CHAMPUS costs, and how we handled this crisis will certainly effect the way Congress looks at us in the future.

JOURNAL: Do you think that recent Congressional pressure to reduce the defense budget and personnel strength will ultimately affect the Medical Department's readiness posture in regard to future conflicts?

LEDFORD: Any significant reduction in funding will have repercussions throughout the system. If you cut personnel, the slack will have to be taken up by others or not be done at all. Combat readiness is our primary mission. We have had assurances from Congress, the executive branch, and senior Army leadership that maintaining high quality healthcare for our troops and their families is a very high priority. In these times of financial and political turbulence, we know we will have to share the burden of downsizing the Army, but we do not expect to be devastated by reductions. We will have to learn new efficiencies to make the best use of the resources available to us. If the AMEDD doesn't streamline itself, there are certainly lots of people waiting to do it for us.

JOURNAL: The conflict in Southwest Asia provided the opportunity to test the capability and readiness of the Army Medical Department and to discover deficiencies and pinpoint areas for improvements. What were the most important lessons learned?

LEDFORD: A "Lessons Learned" conference in San Antonio in August identified 40 key topics/issues to be discussed. Among these were: world wide patient tracking; TO&E medical unit readiness; loss of healthcare capability during mobilization; AMEDD command and control; and PROFIS deficiencies. These are very complex issues that will take a lot of work and intelligence and resources to resolve. Some can be resolved using existing AMEDD resources and/or changes in doctrine, training, policy or leader development programs. Others will require resolution through the Concept Based Requirements System, allowing for the prioritization and acquisition of resources.

JOURNAL: Dr. Mendez called the deployment to Southwest Asia an "unprecedented achievement." How do you feel about the role played by the US Army Medical Department?

LEDFORD: I was the Army Surgeon General at a proud time in American history. To sum it up again--we deployed 44 hospitals and more than 25,000 medical personnel. This was by far the biggest medical force that we have deployed anywhere since WWII. We did in three months what took three years to do in any previous war, which proves that we are more ready than we have ever been before. When I retire this summer I can say with pride that I was part of the Army Medical Department during Desert Shield and Desert Storm.

This double issue is the second in a series of three special issues dealing with the preparations for and the services performed during the actual combat and the lessons learned by the medical services of the US military and coalition forces during Operations Desert Shield and Desert Storm.