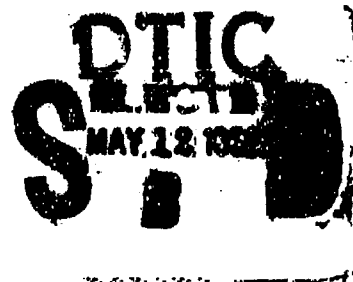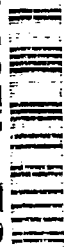AD-A250 436

INSTITUTE REPORT NO. 469

FINAL REPORT

CASUALTY DATA ASSESSMENT TEAM OPERATION DESERT STORM

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William G. Rodkey,
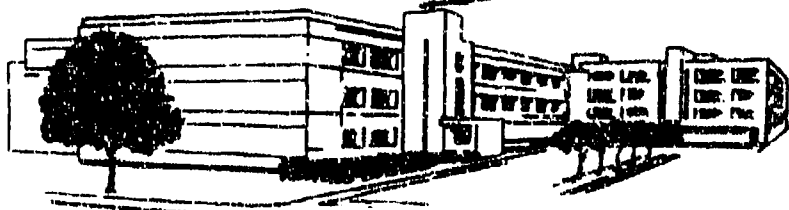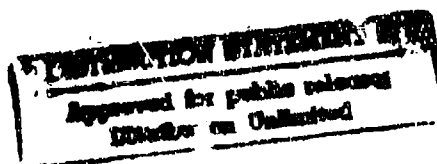Marjorie M. Hunt,
and
Stephen W. Hoxie

Division of Military Trauma Research

Revised January 1992

LETTERMAN ARMY INSTITUTE OF RESEARCH PRESIDIO OF SAN FRANCISCO CALIFORNIA 94129

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_____   (date)
GEORGE J. BROWN
COL, MC
Commanding

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On February 28, 1991 the Combat Data Assessment Team (CDAT) from the US Army Medical Research and Development Command arrived in Frankfort, Germany. Their mission was to interview and to review the medical records of casualties who had been evacuated from Southwest Asia in Operation Desert Storm.

The team interviewed 204 wounded soldiers and reviewed all available records. However, the team was located too far to the rear to obtain detailed information, and the information which was not collected is irretrievable.

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Through interviews with the wounded soldiers, the researchers acquired information that can help provide better medical care in future conflicts. Combat Lifesavers provided initial treatment to 13% of the wounded, and in some cases they were the only treatment which was available for approximately one hour until combat medics arrived; this program should continue. More than two-thirds of the injuries were orthopaedic; research on traumatic orthopaedic injuries should be emphasized. Kevlar vests and helmets performed as they were designed; the command should emphasize wearing this protective gear. Some of the wounded soldiers expressed dissatisfaction with the evacuation; medical evacuation policy, methods, and equipment should be evaluated. The CDAT report includes an analysis of the injuries and deaths which occurred to occupants of the Bradley Fighting Vehicle; this information should be furnished to appropriate commands.

The CDAT Report includes valuable information which could assist a similar team in collecting data during future conflicts.

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DEPARTMENT OF THE ARMY

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REPLY TO
ATTENTION OF:

SGRD-ULY-MT (10-5a)   October 15, 1991

OVERVIEW
Casualty Data Assessment Team - Operation Desert Storm

Mission: Casualty Data Assessment Team (CDAT) collects pertinent data on the care and medical management of combat casualties and victims of military trauma.

Background: Originally, a 30 member team was to be deployed to Operation Desert Storm. Twelve sections (consisting of one AMEDD professional officer and one senior NCO) were to gather data from selected forward evacuation hospitals, and to forward that data to the central analysis unit.

Anticipated Benefits: The team would provide immediate information and analysis to Medical Treatment Facility commanders and line commanders concerning types of injuries and their initial management, thereby helping to minimize combat injuries. After the conflict, the information would provide a detailed data base for future combat casualty care.

Actual Scenario: Circumstances precluded deployment of the CDAT as initially envisioned. A four-member European Contingency Team deployed to three US Army General Hospitals in Germany from 28 Feb 91 through 14 Mar 91. The Contingency Team interviewed 204 wounded soldiers and reviewed all available records.

Significant Issues:

Issue I

Observation/Discussion: Physiologic data on wounded soldiers is limited, and that which is lost is irretrievable. Many of the issues discussed in this report were gleaned only through personal interviews (e.g. Combat Lifesavers and Kevlar®). The CDAT was positioned in Germany, too far to the rear to obtain detailed information. A significant number of the patients arrived in Germany with no medical records from Southwest Asia. Most of those records were so incomplete that they had little value at the next echelon. Some evacuation hospitals had even devised their own forms.

Recommendations:

    a. The Casualty Data Assessment Team should be formally established immediately, well before any future conflict. Injuries should be analyzed on a "real time" basis to screen for new enemy weapon systems, and to evaluate our medical treatment and evacuation system.

    b. Data acquisition should be designed to provide information to the next echelon, to document the excellent medical care, and to collect research data. Future data acquisition should parallel clinical practice, thus accessible and detailed clinical records would provide information for future research and development. Current and near-term computer technology may supplant current methods, and evaluation should begin immediately.

Issue II

Observation/Discussion: More than two-thirds of the wounded soldiers who were interviewed sustained orthopaedic injuries.

Recommendation: Even as the Army downsizes, biomedical <u>research funds</u> should be appropriated. especially for this aspect of combat casualty care.

Issue III

Observation/Discussion: <u>Combat Lifesavers</u> played a significant role in the initial treatment of the combat casualty. Of the wounded soldiers who were interviewed, 13% were treated initially by their Combat Lifesaver. On several occasions this was the <u>only medical treatment</u> available for approximately one hour until combat medics arrived.

Recommendation: The Combat Lifesaver program should continue.

Issue IV

Observation/Discussion: <u>Kevlar</u>® vests and helmets performed as designed. There were numerous hits without armor perforation.

Recommendations:

    a. Command emphasis on <u>wearing</u> protective gear is essential.

    b. Consider <u>extending neck and shoulder protection</u> in the next generation of armor.

Issue V

Observation/Discussion: Although the overall medical care system was praised, wounded soldiers reported long waits, misrouting, and overtaxed care givers on some flights. This dissatisfaction may be attributable to victim impatience or expectations, but the number of comments warrant evaluation.

Recommendation: Evaluate medical evacuation policy, methods, and equipment.

Issue VI

Observation/Discussion: During Operation Desert Storm, some occupants of the <u>Bradley Fighting Vehicle</u> (BFV) were killed or sustained injuries when the BFV was hit.

Recommendation: Furnish the <u>appropriate commands</u> with the analyses of injuries and deaths which occurred to occupants of the BFV.

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Revised 15 October 91

INTRODUCTION

This report by and pertaining to the Casualty Data Assessment Team (CDAT) has been compiled for two primary reasons. The first reason is to document the process which the CDAT, as established within the Division of Military Trauma Research, Letterman Army Institute of Research (MTR-LAIR) pursued while attempting to gain concurrence and approval to conduct assessment of combat casualties in the eventualities of actual conflict arising from what was then Operation Desert Shield. The second reason for this report is to document the actual findings of the CDAT European Contingency Section's survey of WIA's from Operation Desert Storm.

It is a fact that all major trauma centers in the United States have a system to document the history and treatment of their trauma patients, i.e., a trauma registry. Trauma registries serve many important functions. The registry allows the center to review all procedures and outcomes. Consequently, the trauma center staff can identify potential problem areas as well as those areas which work very well. Problem areas can then be more easily corrected, and those methods and procedures which are exceptionally successful can be relayed to others to help improve the level of trauma care throughout the country. Trauma registries provide a mechanism to identify and quantify patient treatment problems that ultimately can be addressed with basic science or clinical research endeavors. Hence, scarce research resources (i.e., dollars and manpower) can more efficiently be directed to areas more likely to solve the most pressing problems.

It would seem logical that the largest health care system in the world would have such an up-to-date trauma registry. One would expect that this health care system would not have a retrospective (years later) system of casualty analysis, but rather it would have a prospective and near real-time analysis of casualties as the military situation and the latest data acquisition technology might allow.

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In this regard the US Army has been a leader in the past in its attempt to assess all aspects of combat casualties. The first such efforts originated during the Civil War. The then Surgeon General of the Army issued an order to have pathology specimens (i.e., amputations and other body tissues) forwarded to a facility which was the forerunner of the Armed Forces Institute of Pathology. COL LaGard reviewed casualties during the Spanish-American War. Efforts by teams of researchers in the European Theatre during World War II provided the extremely valuable data that served as the basis for the publication Physiologic Effects of Wounds, edited by Dr. Henry K. Beecher, published in 1952. Other research efforts from World War II and the Korean War by various individuals were collected and published as Wound Ballistics, edited by MAJ James C. Beyers, MC, in 1962. The Weapons Development and Munitions Effectiveness Teams (WDMET) compiled much information from the Viet Nam conflict that subsequently has been reviewed, analyzed and discussed by COL Ronald Bellamy. Interestingly, the foreword of each of these volumes specifically addresses or eludes to many of the problems associated with epidemiologic surveys and research in a combat environment.

The most recent medical analysis of combat casualties was issued by MTR-LAIR in a report entitled "Report and Medical Analysis of Personnel Injury from Operation Just Cause" (first-authored by MAJ John T. McBride, MC). This report was published and forwarded to The Surgeon General in May 1990, and to this date that report remains the only published documentation regarding combat casualties incurred during the military operation in Panama.

As an outgrowth of MTR-LAIR's analysis of the Operation Just Cause data, we began to devise a much more sophisticated data collection instrument (Appendix B) and analysis system coincident with the publication of that report. These efforts were markedly increased in late August 1990 when it began to appear that Operation Desert Shield might lead to military conflict. Soon thereafter, a completely redesigned data collection card and

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a flexible computerized data base using Dbase IV was developed. This data collection system was developed to address the same types of issues common to major trauma centers throughout the U.S., but it was focused for two specific Army purposes.

The primary purpose was to analyze data collected on combat casualties in a near "real-time" manner with a goal of identifying lessons learned during, not after, the conflict. Such data analysis and timely dissemination of information has the potential to help decrease the morbidity and mortality, and thus maintain the fighting strength. For the line commanders, requisite information would be designed to enhance mission objectives by focusing on preventive methods to reduce operational casualties (e.g., ensuring that protective gear is properly worn, avoiding undetonated explosive devices, etc.) Ongoing analysis and assessment of treatment and evacuation procedures throughout the Theatre of Operation might suggest methods to mitigate morbidity and mortality.

The second intended purpose of this system was to capture the data on the combat casualties for a more complete retrospective analysis. This analysis then could be used as a basis upon which to direct scarce research dollars into future medical research and development efforts that would best help to "conserve the fighting strength".

The Army Medical Department currently does not have a standing system to analyze combat casualties. The following report documents the efforts to ensure that as much of the data as possible from the WIA's of Operation Desert Storm were collected. We reiterate that our concept is not new, but unfortunately many of the problems we encountered also are not new. From Activities of Surgical Consultants, (World War II), Office of the Surgeon General, 1962, the following quote was found:

"Clinical and laboratory investigation should have been considered an integral part and function of the medical department during service in a foreign

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theater...One ranking medical officer in the theater Chief Surgeon's office bitterly opposed 'research in the jungle'. A base surgeon of equal rank was insistent that such an organization would deprive the wounded of proper care. Such attitudes were relics of the dark ages and they delayed progress."

This attitude still prevails in some circles. However, this report represents the tenacious perseverance of MTR Chief LTC William G. Rodkey; the encouragement, assistance and determined support of COL George F. Seng, COL Susan A. McMarlin and MAJ David L. Williams from HQ, USAMRDC; the documented strong support of MG Richard T. Travis (Appendix F); and the critical intervention and vocal support of COL James B. Peake, OTSG, at a pivotal point just prior to commencement of the ground campaign.

DEVELOPMENT OF CDAT

During the early phases of Operation Desert Shield, many suggestions and requests had been made to look at various injuries. By early-to-mid-December efforts were underway to consolidate and define these numerous potential research efforts for Operation Desert Shield from the Medical Research and Development Command (MRDC), with MTR-LAIR as a key player in this effort. Appendix A (Chronology) and Appendix D (Operational Order #1) provide specific details of how the Casualty Data Assessment Team evolved and was envisioned to be implemented in Southwest Asia.

The original CDAT plan was to survey the wounded soldiers as far forward as possible. This effort would provide early physiologic data, effects of wounding and initial results of resuscitation along with any complicating factors such as chemical or biologic agents and their treatment. Evaluation of the medical evacuation system also could be made. It was envisioned that issues such as what types of vehicles (tactical vs. medical and what air assets (tactical vs. medical) were used. Furthermore, we would be able to document the elapsed time for each phase for evacuation.

A dynamic early feedback was also planned. Appropriate medical information would be returned to the Command Surgeon. For example, if issues such as a particular unit repeatedly not wearing protective clothing or a unit with a high number of preventable injuries was identified, then specific notification with documentation could be made through appropriate command channels.

The original CDAT plan called for a total of thirty (30) soldier-researchers to be emplaced in Southwest Asia (SWA). There would be a two-person team consisting of an AMEDD officer and an enlisted member at selected evacuation hospitals. The AMEDD

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officer was to be an MC, an ANC or an MSC, and the enlisted soldier would be from Career Management Field 91 (MOS 91, 92 or 01H). These two-soldier teams at the evacuation hospitals would also have lap top computers with modems for data transmission. Each team would interview patients and record the data on CDAT Form 5.2 (Appendix C). These forms would be collected and forwarded daily (if possible) to the CDAT Central Data Processing Element in Riyadh. The Central Data Processing Element would be composed of the Team Leader, an MC Officer for medical analysis, a computer specialist, and data entry specialists. The Central Data Processing Element would have several desk top personal computers linked in a local area network (LAN) with printers. To facilitate training and to allow for greater flexibility and ease of use, "off the shelf" technology was to be used. The software programs to be used included WordPerfect 5.1, dBase IV, Harvard Graphics 2.1, and Novelle Netware.

With only 12 or 13 two-soldier teams, placement in the Theatre of Operations would have been critical. The plan was to emplace the teams evenly across the forward front to allow for an adequate statistical sample of units which were heavily engaged in combat as well as those less engaged. Since the geographic location of the evacuation hospitals was of greatest operational security, many "what-if's" had to be considered during our planning phases. This fact strongly reinforces the concept that a plan such as this one must be prepared, organized and implemented in peace time so that it can be easily meshed and coordinated with any potential military scenario.

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EUROPEAN CONTINGENCY SECTION (ECS)

After the 15 February 1991 meeting at OTSG, plans were modified to deploy a small CDAT team to Europe, and specifically to place a limited number of individuals at each of the major US Army General Hospitals in Germany. The experience of the initial CDAT from Operation Just Cause indicated that the medical records likely would be incomplete or perhaps missing totally; however, personal interviews with the soldiers were very informative. Thus, having CDAT personnel in Germany represented a central point in the evacuation chain and probably the only chance for significant interviews and direct personal interface with a large percentage of the wounded soldiers from SWA before they were scattered across the US to various military hospitals. The WIA were scheduled to be air evacuated through Europe on their way to numerous stateside hospitals for definitive care.

Composition

The European Contingency Section (ECS) was composed of soldiers from within USAMRDC with varying backgrounds. MAJ John M. Uhorchak, MC, the section OIC, is an orthopaedic surgeon assigned to the US Army's Joint and Soft Tissue Trauma Management Fellowship located within the Division of Military Trauma Research at the Letterman Army Institute of Research in San Francisco, California. MAJ Uhorchak originally was an Armor Officer with the 1st Cavalry Division and later was a General Medical Officer with the 10th Mountain Division. MAJ(P) David Berry is a Clinical Nurse from USAMBRDL. His prior service includes a combat tour in Vietnam as an enlisted medic. CPT James Young is a Medical Service Corp officer from the USAMRDC Operations Office who successfully provided a great deal of valuable interface with that headquarters. Finally, SGT Stephen Hoxie is a Biomedical Research Assistant (MOS 01H).

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SGT Hoxie holds the Bachelor of Science degree and served as the "resident expert" in using dBase IV. His skills with the dBase IV programs enabled the ECS to transform numerous pages of new information into meaningful data.

Functional Operation Of The ECS

The small CDAT team deployed to Germany on 27 February 1991 under the modified plan reflected in Operational Orders #2 (Appendix E). The west coast team members were able to meet with the east coast team members at JFK Airport in New York and travel together to Frankfurt. They arrived early on 28 February 1991. By the time this team arrived on the ground, the suspension of offensive operations in SWA was just a few hours old. The team spent the remainder of 28 February 1991 issuing supplies (i.e, computers, cameras, film, CDAT forms, rental cars, OP Orders, etc) and overcoming jet lag from the overseas flight. On the morning of 1 March 1991 the ECS members were dispersed to their respective hospitals spread across Germany.

The members of the ECS were in telephone contact almost daily so that any administrative or procedural changes could be carried out with minimal delay. The OIC of the ECS was also in almost daily contact with LTC Rodkey, the CDAT team leader at the Division of Military Trauma Research at Letterman Army Institute of Research (LAIR) in San Francisco.

The team members were in place at their respective hospitals when on 2-3 March 1991 the bulk of the WIA's from Operation Desert Storm started arriving in Germany. Over the next 10 days the majority of the WIA's passed through Germany en route to definitive care at military health care facilities in CONUS. Only those from units assigned to Germany remained in country for their care. Oftentimes, within 24 hours the wounded patients would be on an air evacuation flight to CONUS.

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Detailed accounts of each researcher's experience are contained in the Appendices (G through J) to this report. However, there are several issues that were common to each facility in Germany. In brief, each Commander, DCCS, Chief Nurse, and Chief of PAD was consulted. Having the written and signed Operational Order to show the hospital administrative staff was very beneficial. A letter from the PAD Officer which introduced the researchers to the ward personnel facilitated movement throughout the hospital (Appendix L). Of great concern to everybody was that we would require scarce resources (i.e., people) to aid in our research process, and none of these facilities were able or willing to volunteer such resources, at least initially. At the 2nd General Hospital, the Chief of Surgery volunteered two 91C's who were on the transplant organ procurement team. They were SFC Pozaro and SFC Jacobson. With their assistance, the CDAT personnel at the 2nd Hospital were able to double the number of wounded personnel interviewed. These two individuals also aided the team to the orientation of the hospital, introduced team members to key nursing staff and served as "facilitators". Their contributions were tremendous as they interviewed nearly 20% of the total number of WIA's.

The 2nd General Hospital team was also aided by several nurses. COL Green, the Chief Nurse, as the clinical load and situation allowed, had the nurses help with the interview process. These efforts were greatly appreciated by the CDAT.

ECS FINDINGS AND DISCUSSION

This report discusses the findings from personal interviews and record reviews of 204 WIA's from Operation Desert Storm. The Public Affairs Office of the Department of Defense reports a total of 353 WIA's from Operation Desert Storm during the period 22 January 1991 until 11 March 1991.

It should be noted that there are volumes of books on how to code injuries. The CDAT needed a simple yet complete system that could be easily coded into our dBase IV program. Thus, throughout this report there are explanations following certain coding numbers. We recognize that this system double counted some injuries, but all of the double counts were recognized and adjusted for in the final numbers of the report as appropriate.

Demographics

These 204 soldiers sustained a total of 472 wounds, therefore an average of 2.3 wounds, per soldier. A wound was counted if an anatomic area was involved. For example, 10 fragmentation wounds to the soft tissue of the thigh counted as 1 wound. A fragmentation wound to the thigh and one to the foot counted as 2 wounds since 2 specific anatomic regions were involved. If anything, this method tends to undercount the number of actual injuries sustained.

Of the 204 WIA's, 195 were male and 9 were female. One hundred seventy-one were from the US Army, 28 from the US Marines, 1 from the US Navy and data were not recorded as to branch of service for 4 of the WIA's. There were 197 enlisted soldiers, 6 officers and 1 warrant officer (Figure 1). The ethnic background of the 204 WIA's appears to mirror the ethnic distribution in the services. This distribution was as follows: 66%

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Caucasian, 21% Black, 10% Hispanic, 1% Asian and 2% not recorded (Figure 2). Military Occupational Specialty (MOS) distribution was nearly as expected (Figure 3), with a predominance of Infantry (Career Management Field [CMF] 11) and Armor (CMF 19). There was, however, a much higher than expected WIA rate in the Transportation (CMF 88) and in Quartermaster (CMF 77). The higher incidence of WIA's from CMF 88 and 77 are represented by the WIA's from the SCUD attack in Dhahran. One observer noted that while this was not the expected norm based on past history, with onset of the deep battle, large numbers of WIA's in the service support soldiers may be anticipated in future conflicts.

Single Versus Multiple Injuries

Of the 204 WIA's, 36% sustained 1 wound while the remaining 64% sustained 2 or more injuries (Figure 4). These percentages were the exact reverse of what was seen in Operation Just Cause. One explanation is that 68% of the injuries were from fragmentation devices (i.e, grenades, cluster bombs, mines etc.) and under armor debris (spall) from vehicles being hit and penetrated (Figure 5). With many fragments in the air, the potential for multiple injuries increased proportionally.

More specifically, 42% of all wounds were from fragmentation, 26% by spall and 19% by the single SCUD attack. Only 10% sustained gunshot wounds (Figure 5).

Anatomic Distribution of Injuries

The casualties of Operation Desert Storm displayed similar wounding patterns to those seen in past conflicts. Seventy-one percent of all injuries involved the extremities and 29% involved all other locations on the body (Figure 6). The 71% of extremity wounds

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were distributed as 48% to the lower extremities and 23% to the upper extremities. The remaining 29% of all injuries were distributed anatomically as follows: 7% to the face, 4% to the head and neck, 4% to the ear (the majority of these were ruptured tympanic membranes secondary to the SCUD attack), 2% to the eye, 4% to the thorax, 4% to the abdomen, 2% to the pelvis and 1% to the spine (Figure 7). The extremely low percentage of thorax and abdominal injuries may be related to the use of protective equipment, specifically the Kevlar vest. (The entire issue of the use of protective equipment is addressed in more detail later in this report.) A further breakdown of specific head, thoracic and abdominal injuries is presented in Figure 8.

Injuries to the Extremities

The large number of orthopaedic injuries have been analyzed in greater detail. The injuries to the extremities in our 204 WIA's were as follows: 55% to soft tissue alone, 39% were open and closed fractures, and 6% were intraarticular injuries excluding intraarticular fractures (Figure 9). Of the 472 total wounds, 108 were to the upper extremity. There were 61 soft tissue injuries which included 23 to the arm, 7 to the forearm, 20 to the hand and 11 to the joints (shoulder, elbow and wrist). Closed fractures accounted for 10 injuries, and open fractures accounted for 29 injuries. Fortunately, there were only 4 grade IIIC (open fracture with vascular injuries) total with 1 in the arm and 3 in the hand (Figure 10).

The lower extremities sustained 229 of the 472 total wounds. Again soft tissue wounds comprised the majority of these injuries (68 to the thigh, 48 to the leg, 14 to the foot, and 6 to the joints including hip, knee and ankle). There was 1 nerve and 1 vascular injury to the thigh, 2 nerve and 2 vascular injuries to the leg, and 3 popliteal artery injuries around the knee. There were 72 fractures with the majority (63) being open fractures. There were 5 open femoral fractures, 22 open tibial fractures, 18 open foot fractures and 18

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open joint wounds. Of special note is that this number includes 5 bilateral open tibial fractures and 1 open femoral fracture with a contralateral tibial fracture in the same patient. The grade IIIC injuries to the lower extremity fortunately were quite low. Included in this type of fracture were 2 of the femur, 1 to a tibia, and 17 to the feet (Figure 11).

In the 204 WIA's, there were 18 traumatic amputations. Fragmentation devices caused 16 of these amputations while gunshot wound and spall accounted for 1 each. There was one above the elbow, 2 to the hands and digits, 3 above the knee (one by gunshot wound), one knee disarticulation, 2 below the knee (1 by spall), 8 foot and toe amputations, and 1 traumatic mandibular hemisection (Figure 12). The high number of foot and toe wounds can be attributed to what the soldiers call "toe poppers" described as 2 discs joined together like a dumbbell with just enough explosive charge to destroy the forefoot.

Protective Equipment

Thirty-one of the WIA's specifically remembered having been hit on their Kevlar vests. Only 6 of the soldiers that sustained hits on the vests sustained abdominal and/or thoracic injuries. There were likewise 19 known hits on Kevlar helmets with only 2 subsequent head injuries (Figure 13). The other head and neck injuries were to areas not covered by the helmet or other protective wear. This finding appears to represent a subset of soldiers that were protected by their Kevlar gear.

It is important to remember that the percentage of soldiers protected by their Kevlar gear is based not on 204 WIA's, but rather on 165 WIA's. The reason is that 39 of the WIA's were from the SCUD attack and were wearing no protective gear at the time. Most of the SCUD victims were in PT uniforms or other soft clothing getting ready for bed or already sleeping at the time of the direct hit and explosion of the SCUD. These individuals

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were assumed to be in a "safe" area and therefore were not wearing protective gear of any kind.

One of the authors of this report (JMU) was able to review the autopsy reports of all KIA's while at the Armed Forces Institute of Pathology. There were not enough data recorded on the KIA's to determine what percentage of the deaths were from failure of the protective vest or helmet.

The protective effects of the gloves can only anecdotally be addressed. There were a few flash burns to the face and hands, but the rest of the body was protected from the flash burns by MOPP suits until the vehicle fire extinguisher system functioned. There were also noted to be a small number of "ring" flash burns at the wrist where there was a gap between the protective gloves and the MOPP suit. All of these soldiers were in MOPP level 2.

Combat Lifesavers

Twenty-six of the WIA's were initially treated by unit Combat Lifesavers (CLS). There was uniformly high praise for the Combat Lifesavers from the wounded soldiers treated by a CLS. Because most of the physiologic data were not recorded or were lost, it is not possible to estimate accurately the true effectiveness of the CLS to prevent clinical shock. However, it appears that this program is effective in both initial early treatment and

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in being a positive morale booster for the fighting soldiers. This program seems worthy of continuation.

Friendly Fire

Friendly fire injuries and accidental fratricide were concerns before the start of the war and continued to be issues of great concern. Historically, friendly fire has always been a problem since the beginning of maneuver warfare. From the publication "Wound Ballistics" (OTSG, 1962) the New Georgia Campaign reported 17% and the Bougainville Campaign reported 12% incidence of friendly fire casualties.

In our initial briefings to OTSG (23 July 1991) and to DoD (HA) (24 July 1991), we reported 9 of 165 WIA's (does not include the 39 SCUD victims) to have been from friendly fire. This number was based on the actual interviews and the personal beliefs of the injured soldiers. Current reports (Army Times, 19 August 1991) now have confirmed a much higher number secondary to a battlefield survey of the remaining hulls of damaged vehicles. Many of these vehicles were found to have traces of radioactive residue secondary to depleted uranium penetration, a unique feature of US armor piercing rounds. They are now listed as friendly fire casualties. Especially noteworthy of this finding is that for the first time in history, a method of accurately determining friendly fire casualties is available.

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Preventable Injuries

The following are vignettes on several preventable injuries that occurred during Operation Desert Storm. We recorded 14 injuries that clearly appear to have been preventable. An initial concern was that support soldiers might be more susceptible to such injuries because of their lack of familiarity with the potential hazards. However, the distribution by MOS of preventable injuries was fairly uniform, but with a slight predilection for CMF 11 (Figure 14). Continual and repetitive safety education and command emphasis are essential to preclude these injuries in future conflicts.

1.   "(a soldier) kicked a cluster bomb even after (another soldier) told him it was a bomb. The bomb detonated."

2.   "...(soldier)...was told a device was harmless. He picked up the device and threw it at a friend. The friend failed to catch the object, and it struck his helmet. The device detonated, killing the friend."

3.   "...(soldier)...found a cluster bomb. He was not sure what it was, so he decided the safest thing to do was to detonate the device. He threw rocks, boards, etc., at the device, but it failed to detonate. He then picked up the bomb to take it to his CO for disposal. En route, he dropped it, and the bomb exploded."

Battle Scenario

Figures 15 through 21 contain diagrams of Bradley Fighting Vehicles, their occupants, and a brief description of what happened to each occupant. The vehicle

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occupants are numbered one through "x" from top left to bottom right. The color (b/w) code used to describe the condition of the vehicle occupants is as follows:

> Green (gray) = Combat effective.
>
> Blue (right hatch) = WIA. Needs surgical treatment.
>
> Red (cross hatch) = Thermal burns. Requires hospitalization/surgery.
>
> Black (solid) = KIA.

The scenario of the first three vehicles is that of Bravo Company, 1/41 Infantry, 2nd Armored Division. This engagement occurred around 0200 hr, 27 FEB 91. We have subsequently learned that this battle represents another friendly fire incident (Army Times, 19 August 1991).

The benefits of recreating such scenarios are several. First, it gives us an idea of how our equipment functions in both vehicle protection and individual protection under varying conditions. Second, it helps validate pre-combat casualty prediction factors, thus helping to refine our future prediction capabilities. These enhanced abilities will help insure that adequate medical resources are directed to support the correct size unit and combat operation combination. In a short war such as Operation Desert Storm, these benefits are not as pronounced as they would have been in a prolonged engagement.

Conclusion

Based upon the analysis of data from personal interviews and review of medical records of 204 WIA from Operation Desert Storm, we are able to confirm specific findings

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and can speculate on certain "soft" observations. The "soft" observations are just that and cannot be statistically validated from our data.

FACTS:

- The majority of the wounds were orthopaedic in nature.

- Seventy-one percent of all wounds involved the extremities.

- The Combat Lifesaver program was valuable and should be continued.

- There was uniform high praise from the WIA for Combat Medics and the medical system overall.

- The protective gear performed well and reduced head, chest and abdominal wounds.

- Medical records generally lacked pertinent information. For example, there was no consistent recording of physiologic data such as BP, HR, Hct, UA, etc. "MFW" (multiple fragment wounds) was a term used to describe any wound from a simple 1 to 2 cm fragmentation laceration to a severe traumatic disruption of the popliteal artery.

"SOFT" OBSERVATIONS:

As stated, we cannot prove these observations. Many resulted from casual, but repeated, comments. We raise these issues as potential major problems. Hopefully, the appropriate agency or branch specialists will confirm or deny these observations, and policies and procedures subsequently will be altered as necessary.

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• There were several negative comments about the medical care in transition from the Army Medical System to the Air Evacuation System, especially at KKMC. The comments emphasized too few health care providers and their mental attitude. This problem may be only one of perception by the WIA since they go from relatively intense one-on-one care to austere, yet adequate, evacuation care.

• Several WIA stated that the CDAT interviewers were the first (and interested) people with whom they could talk in detail about their wounds and "unload" their stories and fears.

• Some WIA had already received their Purple Hearts and citations, others only had an RFO, and several WIA had received no indication if they would even be awarded a Purple Heart. Consequently, many of these WIA were very dissatisfied and angry beyond a level expected for the type and severity of their injuries.

RECOMMENDATIONS FOR THE FUTURE

The senior members of this Casualty Data Assessment Team strongly believe that some permanent mechanism must be established so that an element of the DoD will be able to survey combat casualties in future military conflicts. Resources and appropriate staffing to accomplish that task must be identified and committed.

The specific recommendations which follow fall into four areas. These areas include 1) the permanent team, 2) personnel, 3) logistical support, and 4) medical records.

A formalized permanent standing CDAT Team should be developed and established. The tasking for this team must come from a high level within DoD to provide appropriate emphasis to the necessity for this team. The team should have a formal mission statement, an organizational description, a command structure, and most importantly, a dedicated source of funding. The team should have a standing operational order from an appropriate major command so that gaining access to and functioning within a Theatre of Operation does not become a complex act of crossing command lines. One potential solution might be that members be provided a DoD or DA IG Card equivalent. This team should be developed along the concept-based requirements system to permit maximum flexibility to answer the most pressing questions that pertain to trauma management with the most current and state-of-the-art technology available.

This permanent CDAT Team likely will need two sets of personnel. A permanent cadre assigned to a major medical research and development command will be necessary to stay abreast of the required technology. The remaining team could be recruited from those medical department professionals who might not be assigned currently to a research position but who have shown a specific aptitude and a definite interest in such a team. The

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team should have a mix of all medical department professionals as each provides unique perspective to the overall successful function of the team. The CDAT Team Leader, like our medical treatment facilities, should be a physician trained in a surgical specialty, and preferably one with a strong research background. We further recommend that this CDAT be not just staffed by Army personnel but rather it be a joint services effort. We feel that having medical department professionals from the Army, Navy and Air Force would enhance the overall flexibility and capabilities of the CDAT. We further recommend that the CDAT come under the command and control of the US Army Medical Research and Development Command. We also recommend that the US Army (the Surgeon General) be the executive agency for the CDAT.

Logistically, the team needs to be as self-supporting as possible. It was quite apparent even to the members of the European Contingency Section that the hospital administrative staffs were extremely concerned that the team would attempt to divert scarce resources (i.e., personnel) from patient care over to the research mission. Designated members of the team should closely monitor technological advancements and be prepared to use the latest and most up-to-date "off the shelf" computer hardware, software and electronics. Advanced instrumentation such as hand held push button algorithmic computers are becoming more available and simple to use. Our system will be most successful when the clinician is provided with a computer that works just as he practices. Hence, as the clinician performs his normal medical functions, he simultaneously enters the data necessary for successful research.

The fourth recommendation deals with the necessity to develop a more efficient yet complete (i.e., correct diagnosis) medical record. For example, the one page Royal Army/Navy form that provided basic demographics at the top, an anatomic diagram (front and back of the body) in the middle with space in the margins for annotations, and several lines at the bottom of the form to add a complete diagnosis and some narrative is one which

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should be given serious consideration. The reverse side of the form was used for all progress notes and medical orders. If a good baseline medical record was developed, instituted and used, then the team could more easily pursue a particular area of concern in much greater detail (e.g., a particular fracture pattern, septic shock problems, acute renal failure, etc.).

Finally, based on the above recommendations, one possible scenario of how the team might be organized, established and trained is as follows. The complete CDAT Team (cadre and PROFIS or other filler personnel) would meet in a central location at least once each year. The team would then decide which specific areas should be researched/investigated for the coming year should a military conflict arise. Those decisions would be based on many factors as well as specific command input from OTSG, USAMRDC, and the subordinate research laboratories. The CDAT members would also be responsible for staying abreast of current issues on trauma and resuscitation as well as weapons technology. These would provide other areas of potential research. The CDAT Team Leader would then submit the list of recommendations for command concurrence and approval. Once approved, the cadre would be responsible for identifying and selecting potential computer hardware and software for implementation. A very limited quantity of the hardware and software would be purchased for field testing in areas such as the National Training Center, the Jungle Operations Training Center, in disaster relief efforts, etc. Armed with this information and based on the results of the field testing, should military conflict arise, complete data acquisition systems could be purchased and distributed as the team mobilizes.

CONCLUSIONS AND SUMMARY

This report documents the initial conception, implementation and research survey findings of the Casualty Data Assessment Team which in part deployed to Europe during Operation Desert Storm. Recommendations are provided to encourage and assist future development of a permanent formalized CDAT so that valuable combat casualty care data can be efficiently and effectively acquired and appropriately analyzed.

ACKNOWLEDGEMENTS

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FIGURES

INTERVIEWEE DEMOGRAPHICS (n=204)

- Sex
  - Male   195
  - Female   9

- Service
  - Army   171
  - Navy   1
  - Marine   28
  - Unknown   4

- Rank
  - Officer   6
  - Warrant Officer   1
  - Enlisted   197

Figure 1   27

ETHNIC BACKGROUND

Figure 2

28

Number of Soldiers (n=204)

Race

Caucasian 66%
Black 21%
Hispanic 10%
Asian 1%
Unkown 2%

MOS

Med (CMF 91) 3%
Trans (CMF 88) 9%
QM (CMF 77) 9%
Mech (CMF 63) 9%
Sig (CMF 31) 5%
AR (CMF 19) 14%
FA (CMF 13) 4%
Eng (CMF 12) 4%
Inf (CMF 11) 22%
Others 21%

Figure 3

29
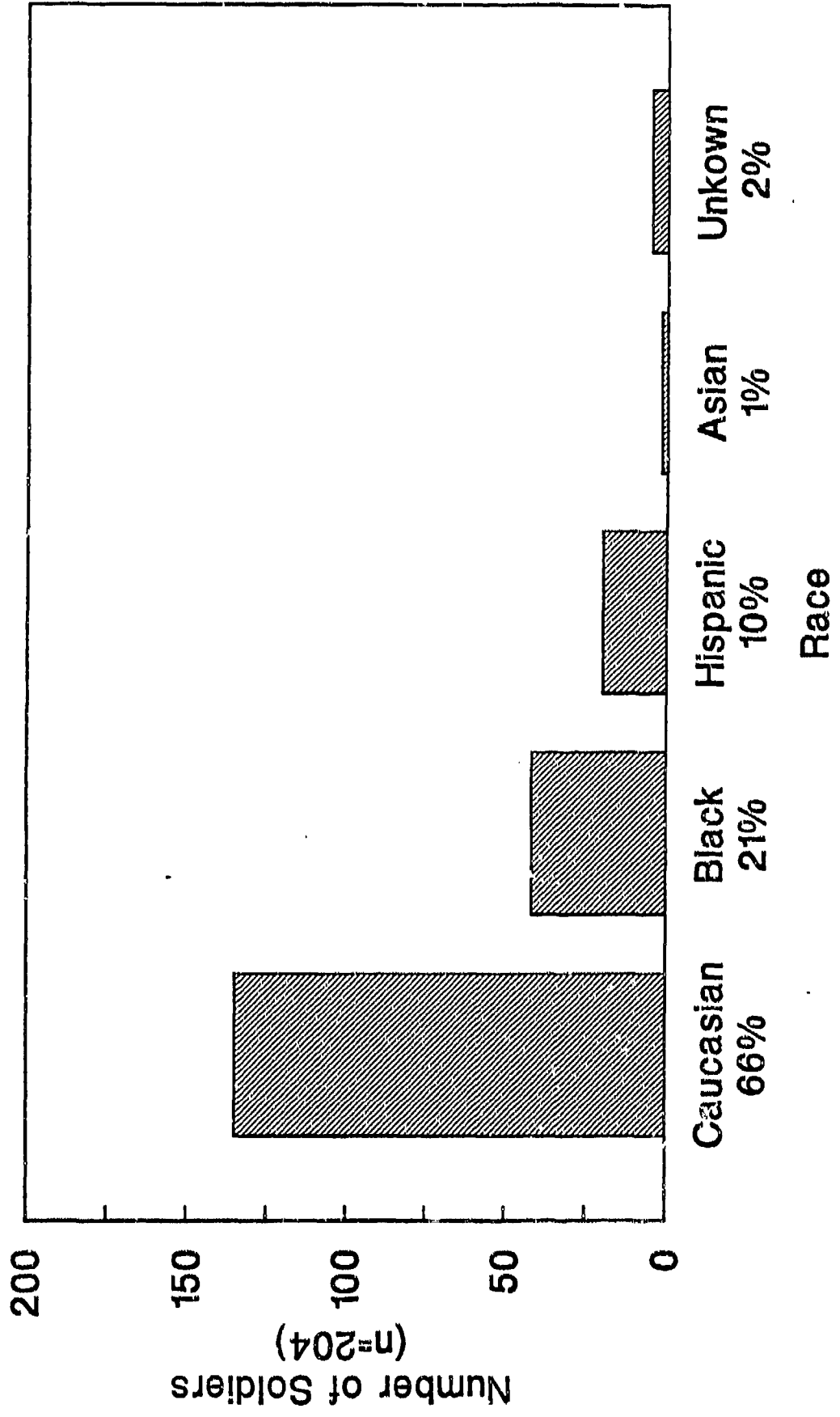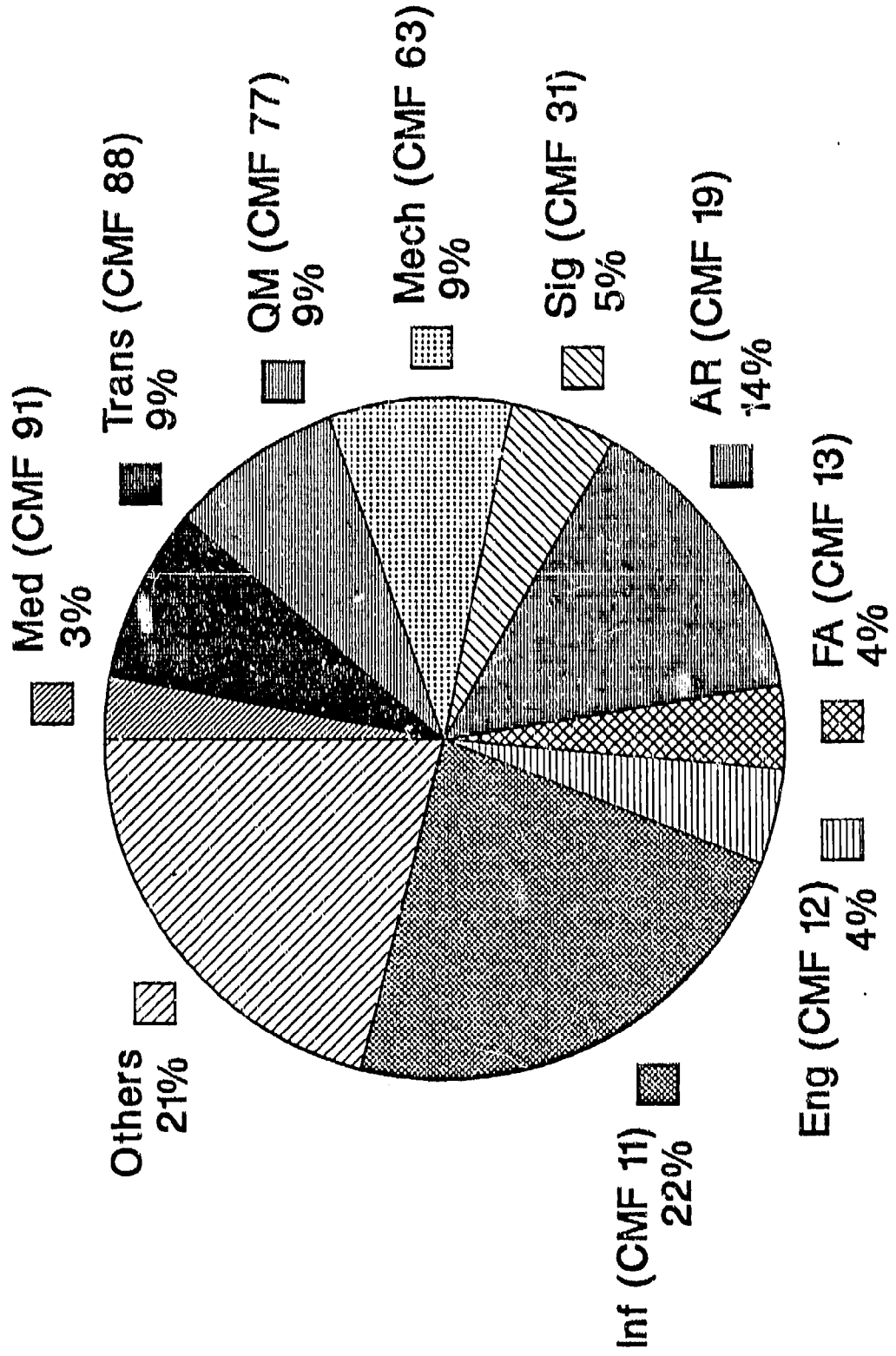
MULTIPLE PHYSICAL INJURIES

Injuries per Soldier

| One 36% | Two 27% | Three 15% | Four 13% | Five 9% |

Number of Soldiers (n=204)

Figure 4 . 30
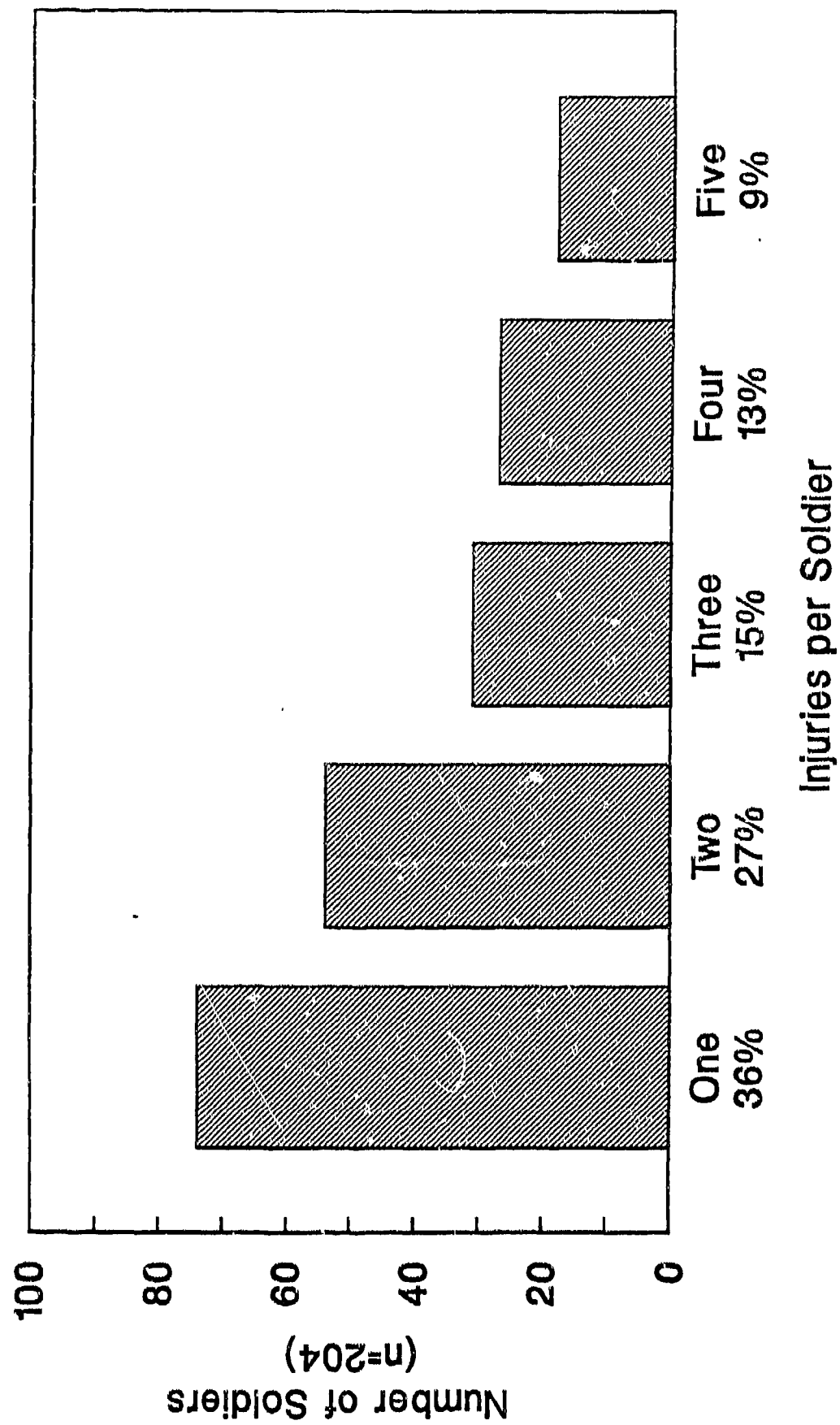
PRIMARY CAUSE OF INJURIES
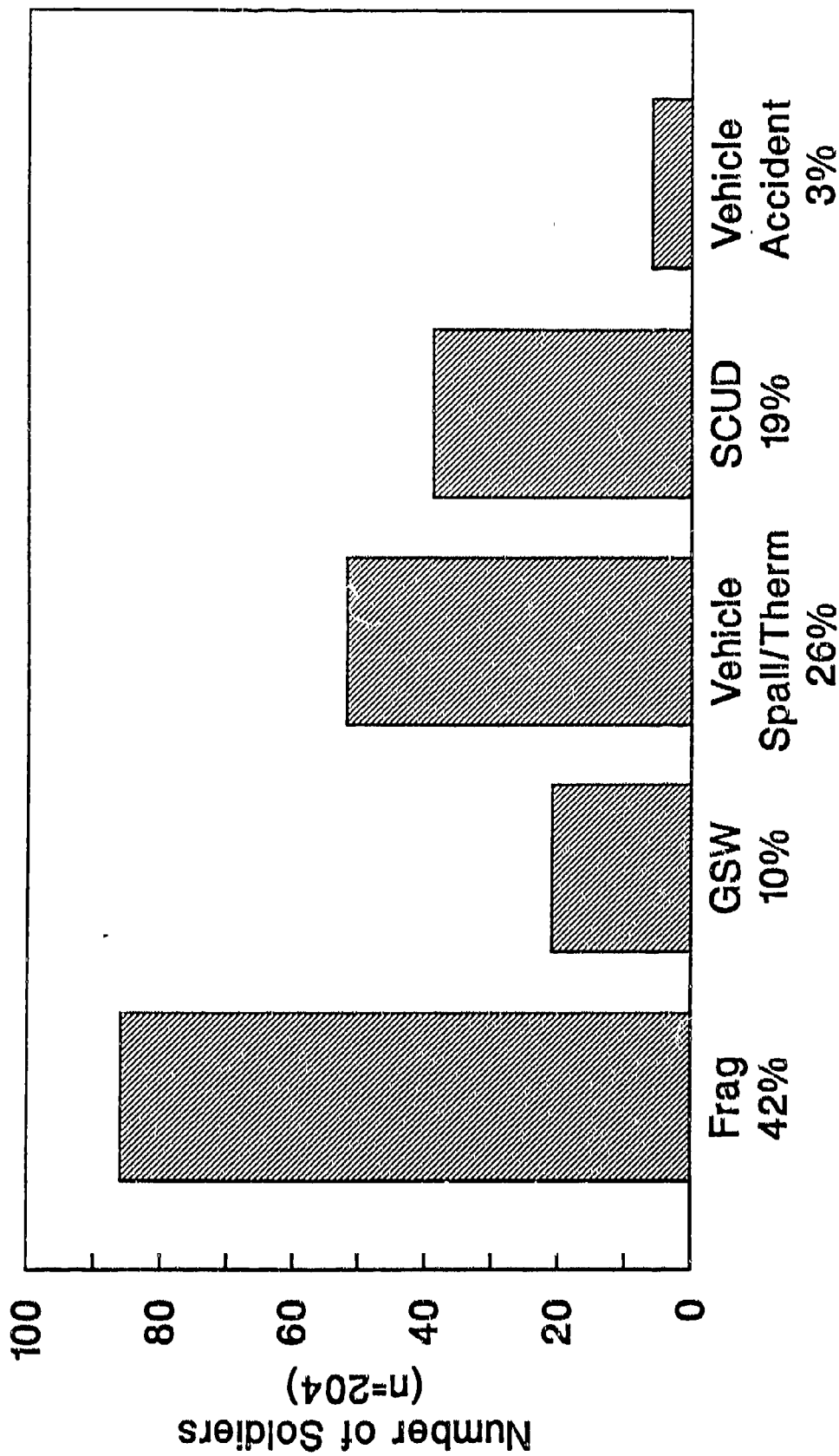
Figure 5   31

PHYSICAL INJURY LOCATION

Figure 6   32

Number of Wounds (n=472)

Extremity 71%

All Others 29%

PHYSICAL INJURY LOCATION

Number of Wounds (n=4772)

	L Ext	U Ext	Face	Hd&Nk	Ear	Eye	Abd	Thorax	Pelvis	Spine
	48%	23%	7%	4%	4%	2%	4%	4%	2%	1%

Anatomic Distribution

Figure 7   33

ORGAN INJURIES

Figure 8 . 34

Brain Teeth Lung Stomch Sm Colon Liver Spleen Kidney Genitals
Intestines

Number of Wounds (n=27)
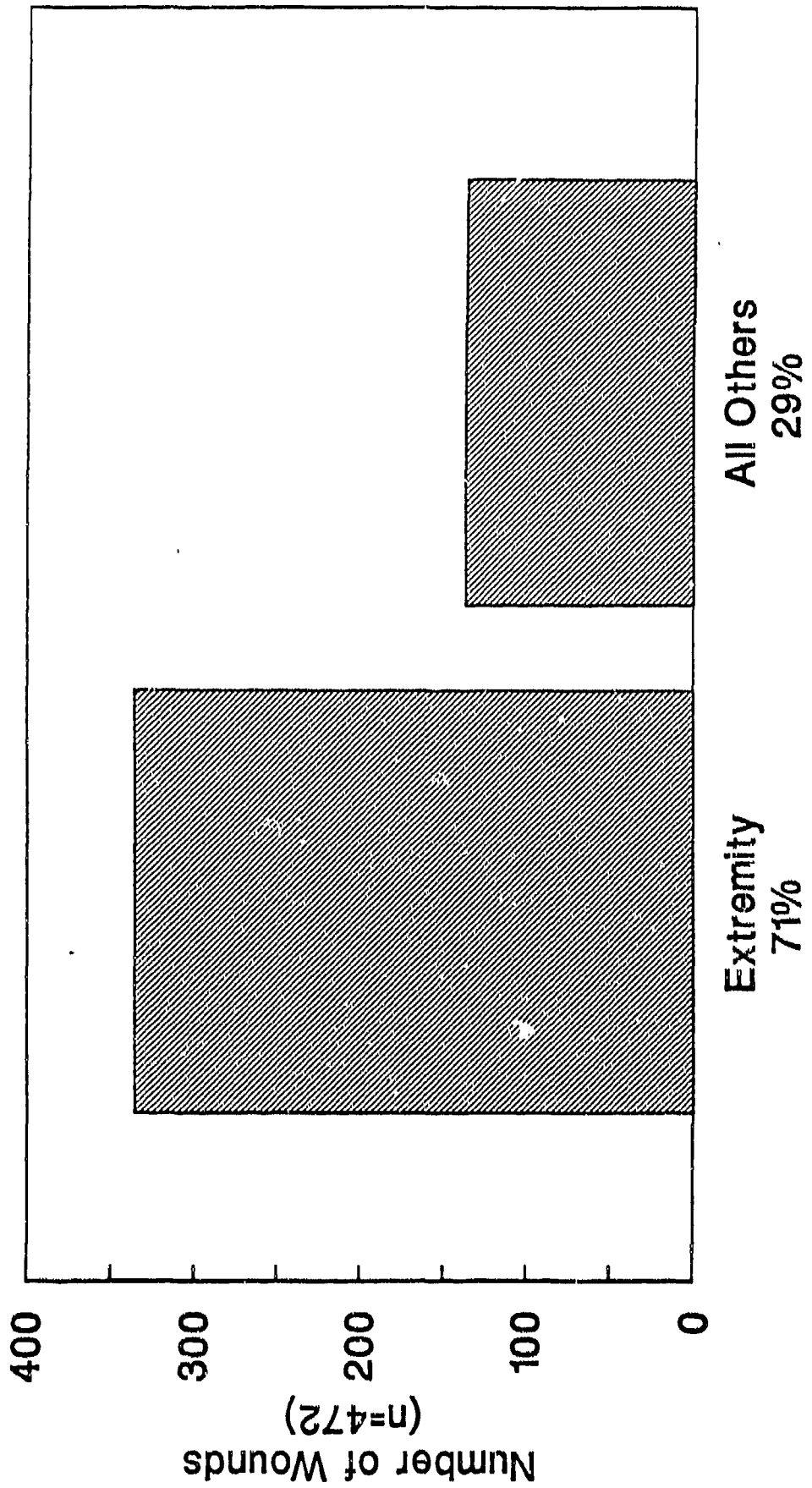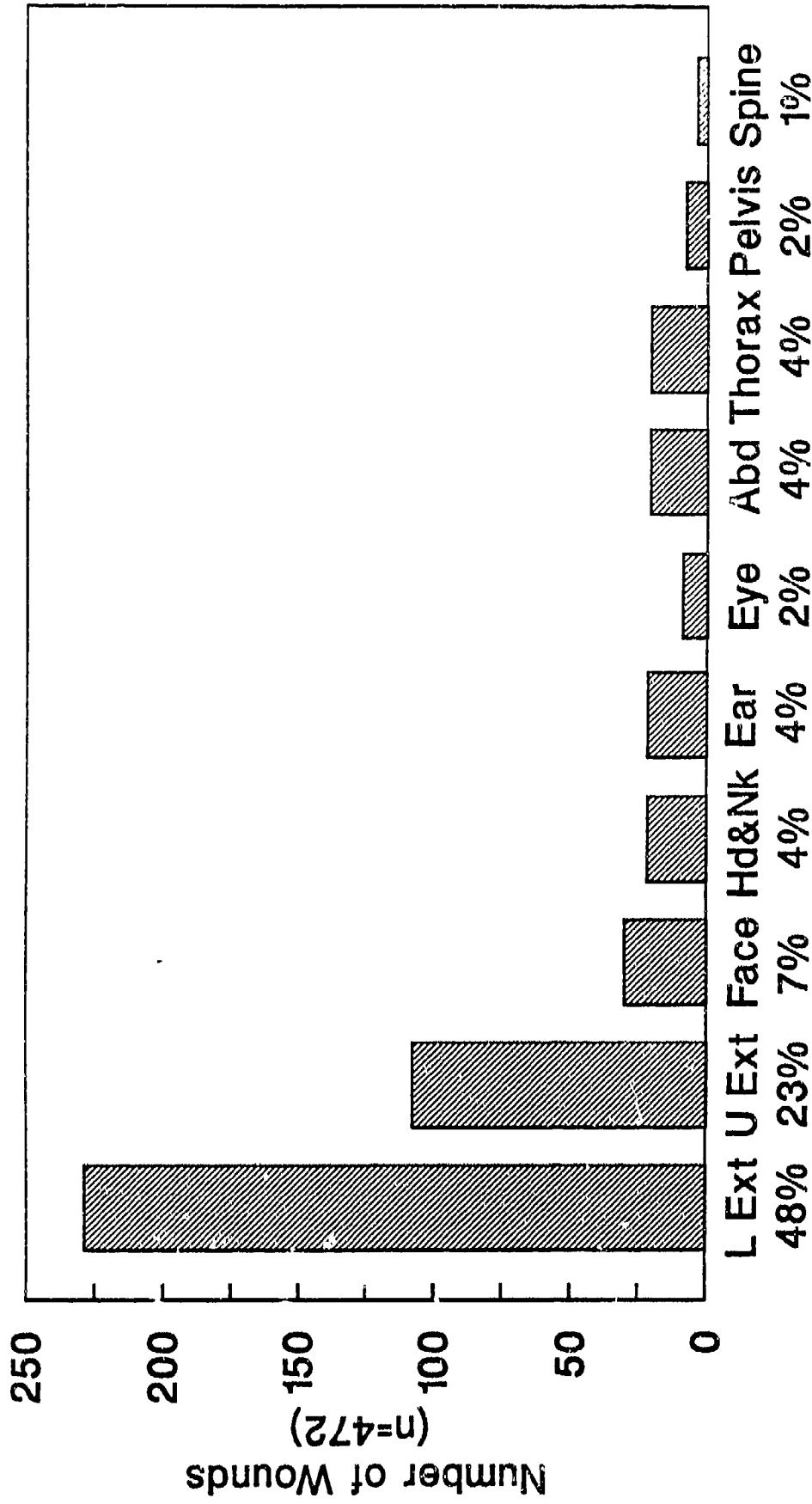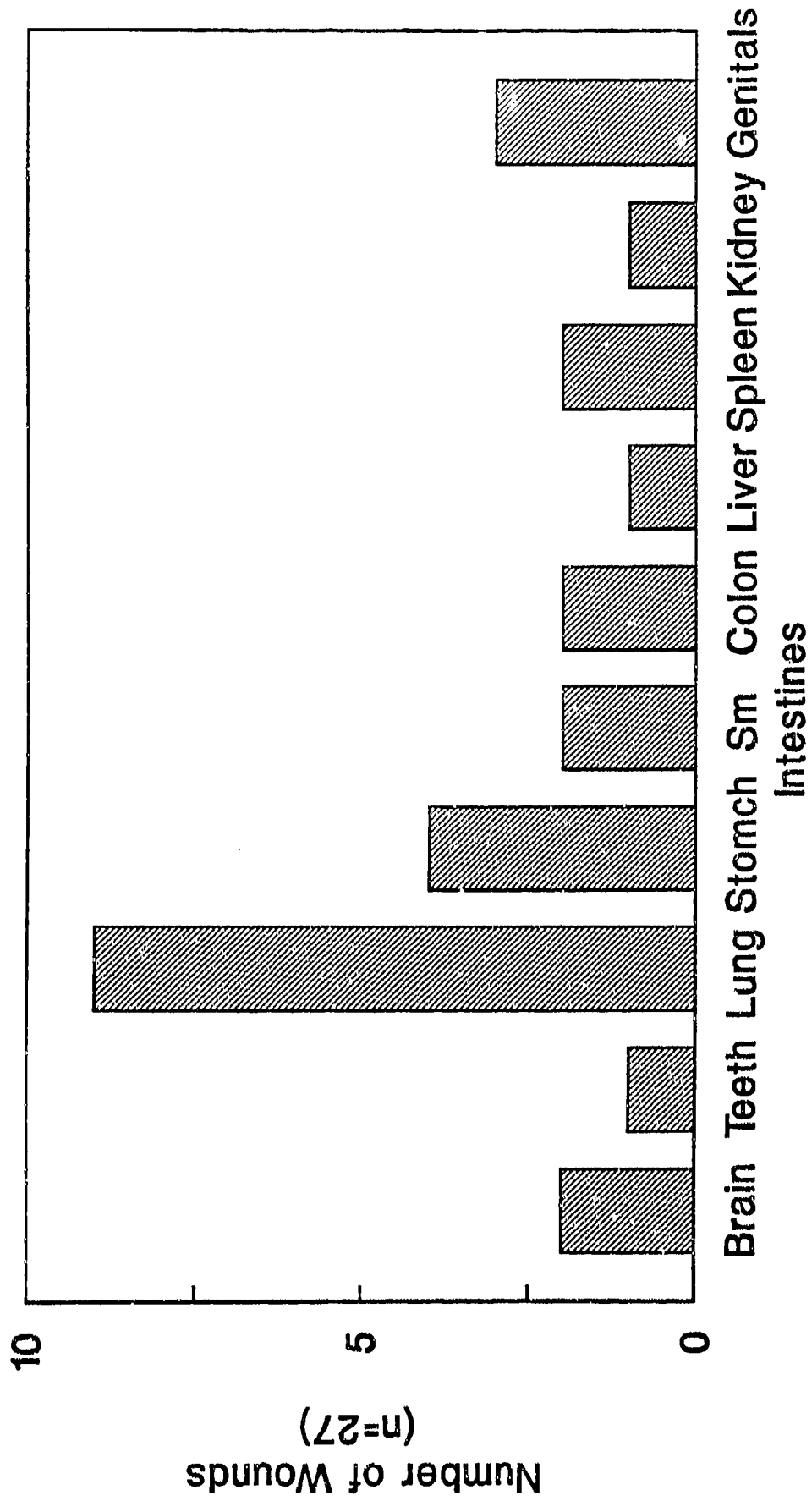
MUSCULOSKELETAL INJURIES

Number of Wounds (n=335)

200 — 150 — 100 — 50 — 0

Soft Tissue 55% Fractures 39% Intra-Art Intra-Art w/ fracture Intra-Art w/o fracture 6%

Anatomic Distribution

Figure 9   35
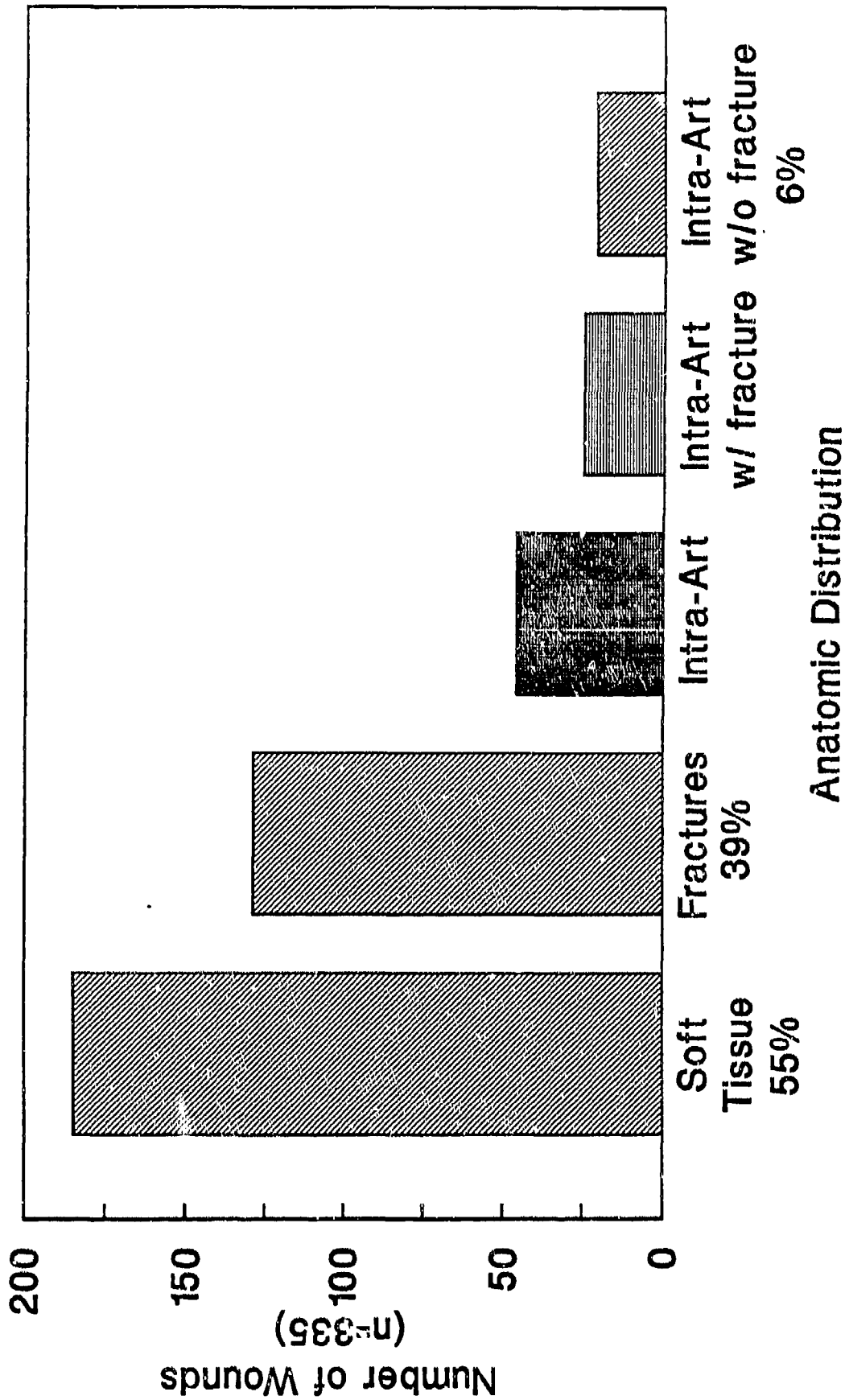
UPPER EXTREMITY INJURIES

Figure 10 . . 36
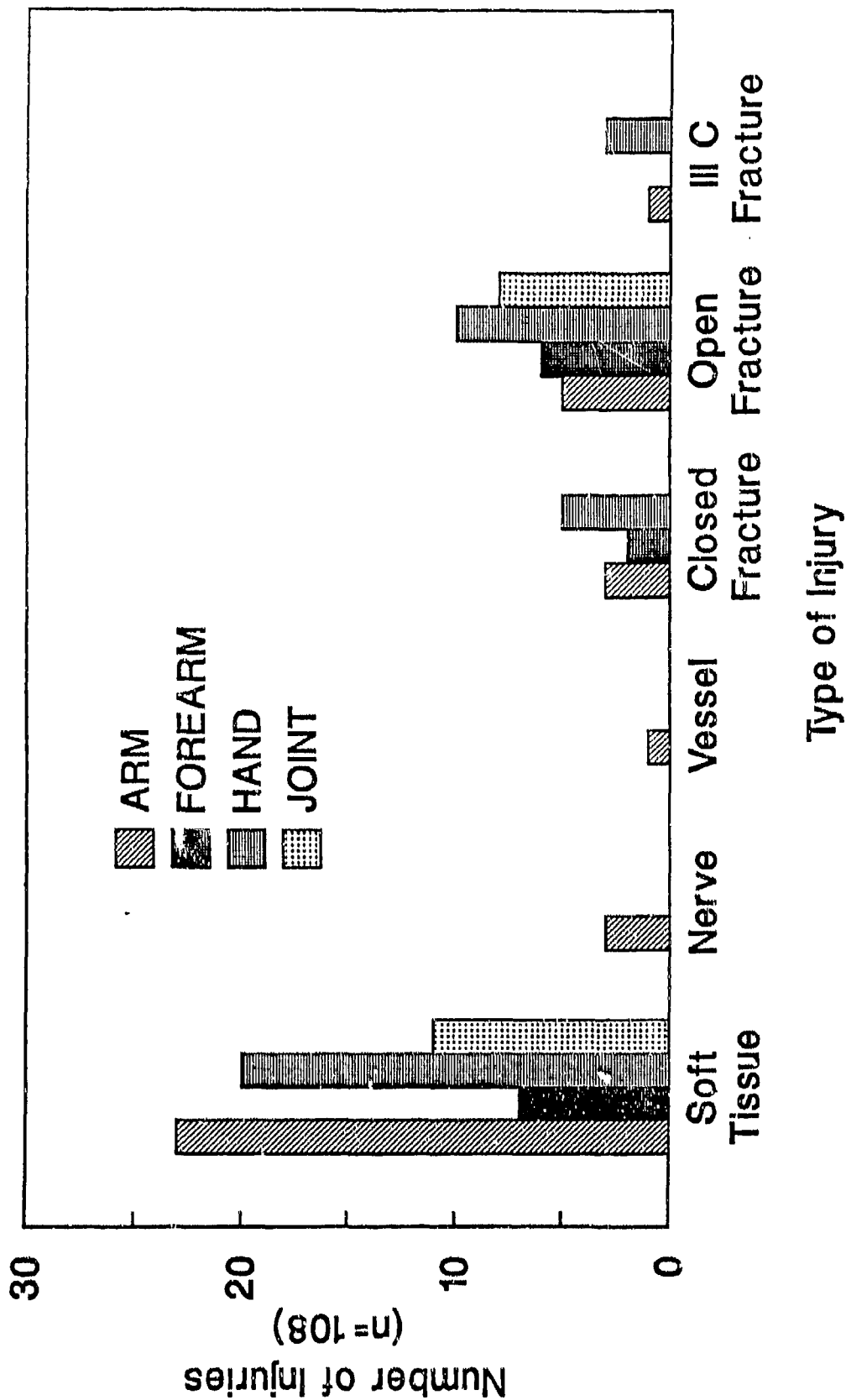
LOWER EXTREMITY INJURIES

Figure 11   37

Figure 12   38
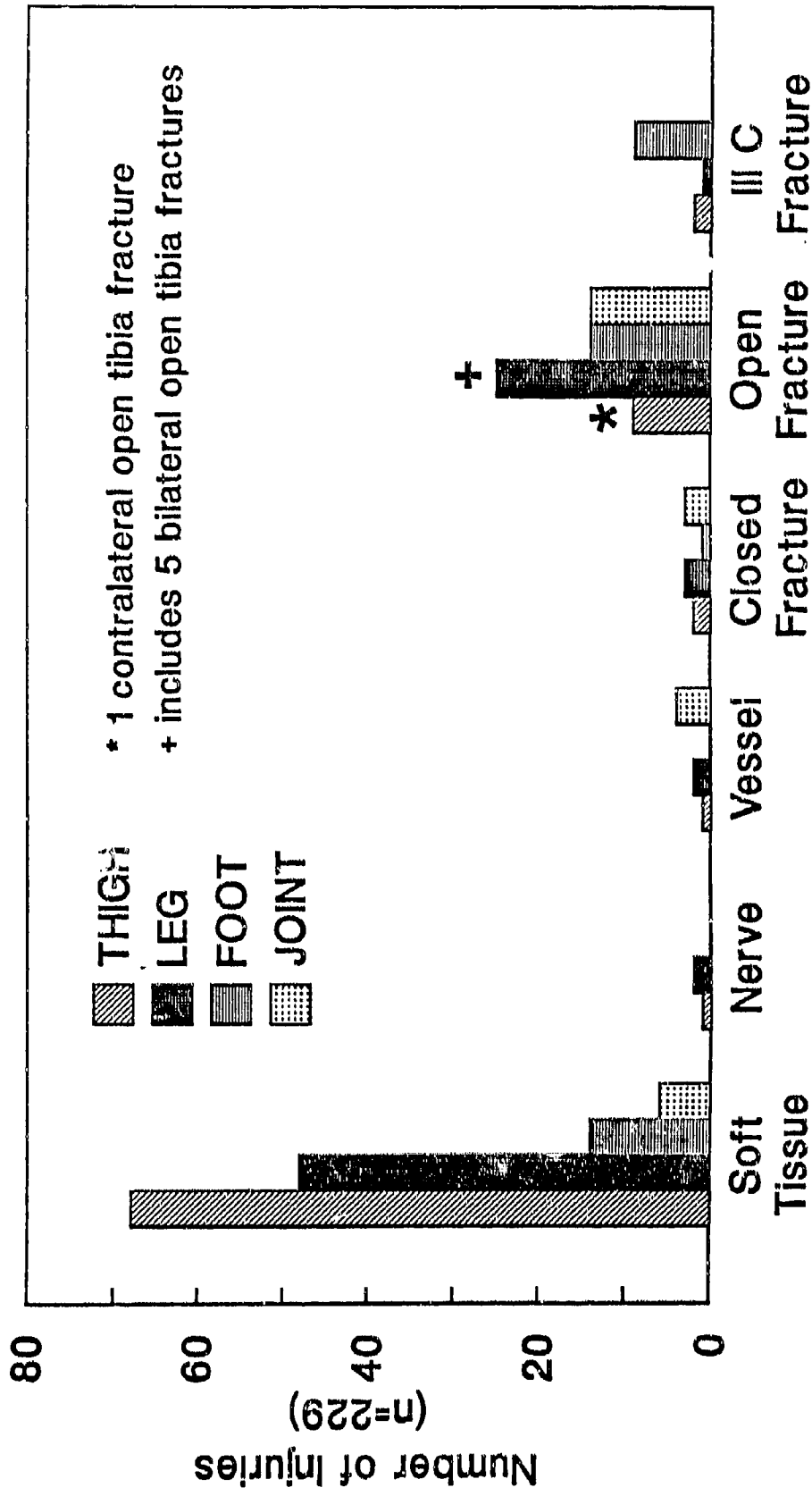
CAUSES OF AMPUTATIONS
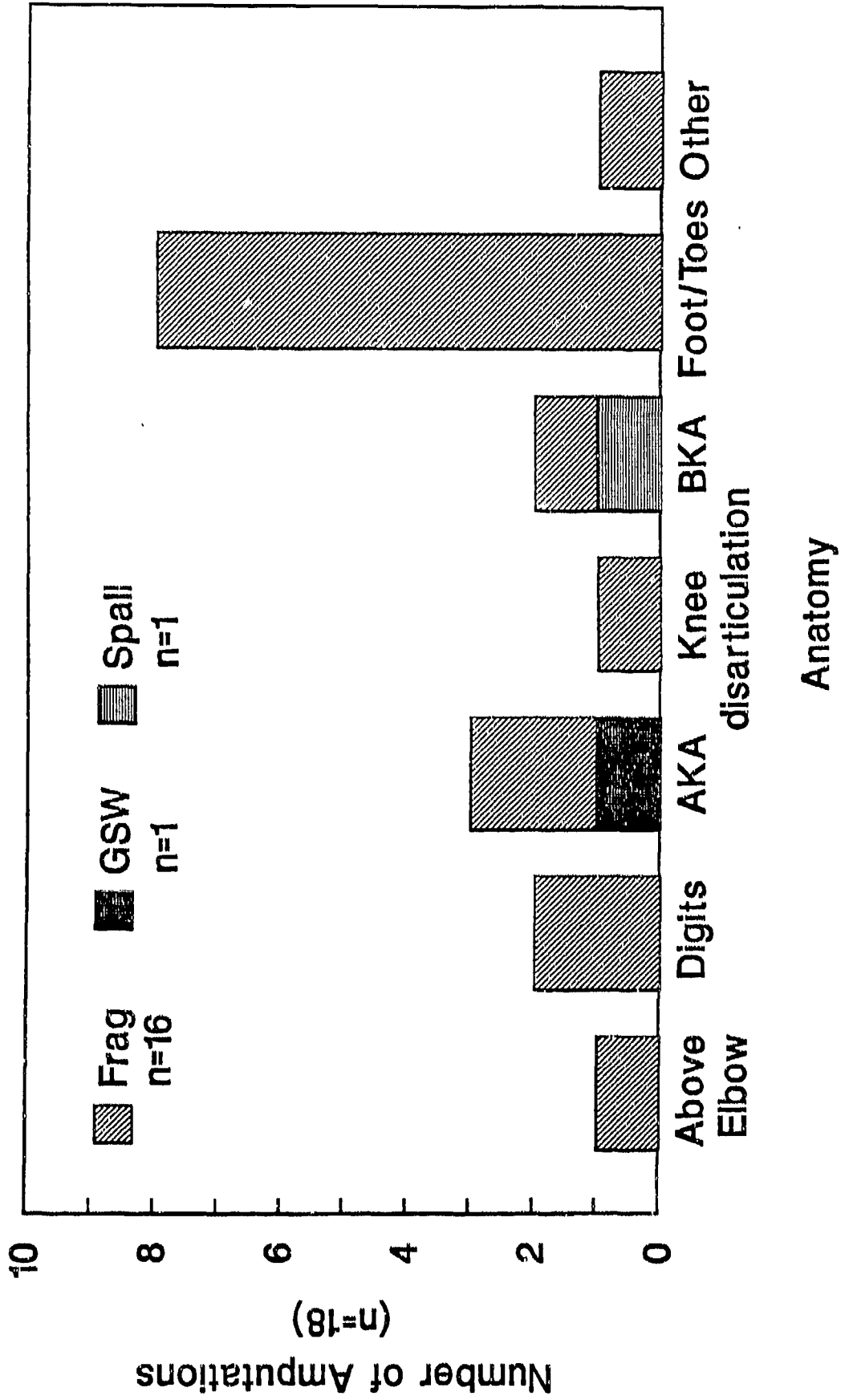
PROTECTIVE EQUIPMENT
(Kevlar)

Figure 13

Figure 14   40
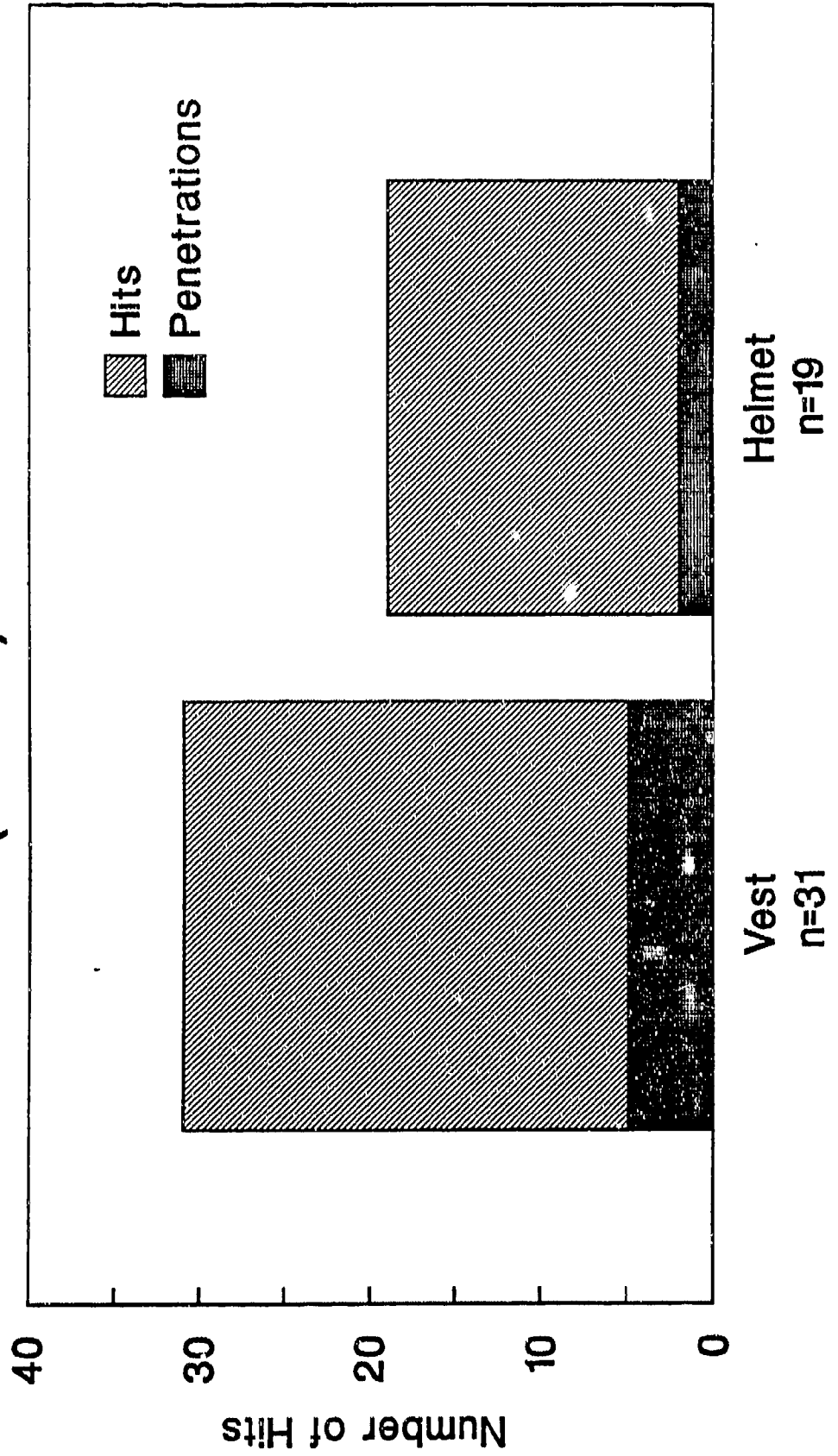
PREVENTABLE INJURIES

CMF	n
Inf (11)	5
Eng (12)	1
FA (13)	1
Sig (31)	1
Gen Mech (52)	1
Chem (54)	1
Mech (63)	1
Trans (88)	1
Marines	2
Total	14 (7%)

Night Attack

B Co. 1/41 Inf 2 AD

27 Feb 1991
(0200-0300 hrs)

Iraq (20 km from Kuwait)

Vehicle occupants are numbered one through "x" from top left to bottom right.

Green (gray) = Combat effective.
Blue (right hatch) = WIA needing surgery.
Red (cross hatch) = Thermal Burns.
          Requires hospitalization/surgery.
Black (solid) = KIA.

Legend for Bradley Fighting Vehicle diagrams.

Figure 15   41

B-6
(B-26)

B-32

B-36

B-34

B-33

B-21

B-24

B-22

Figure 16   43

44   Figure 17

1.   No injuries

2.   No injuries

3.   No injuries

4.   Bilateral lower extremity soft tissue wounds, left arm soft tissue wounds

5.   Bilateral lower extremity amputee - KIA

6.   Right open femur fracture, bilateral lower extremity soft tissue wounds

7.   Left open ankle fracture

8.   Unspecified soft tissue wounds

9.   Right ankle fracture

Figure 17   45
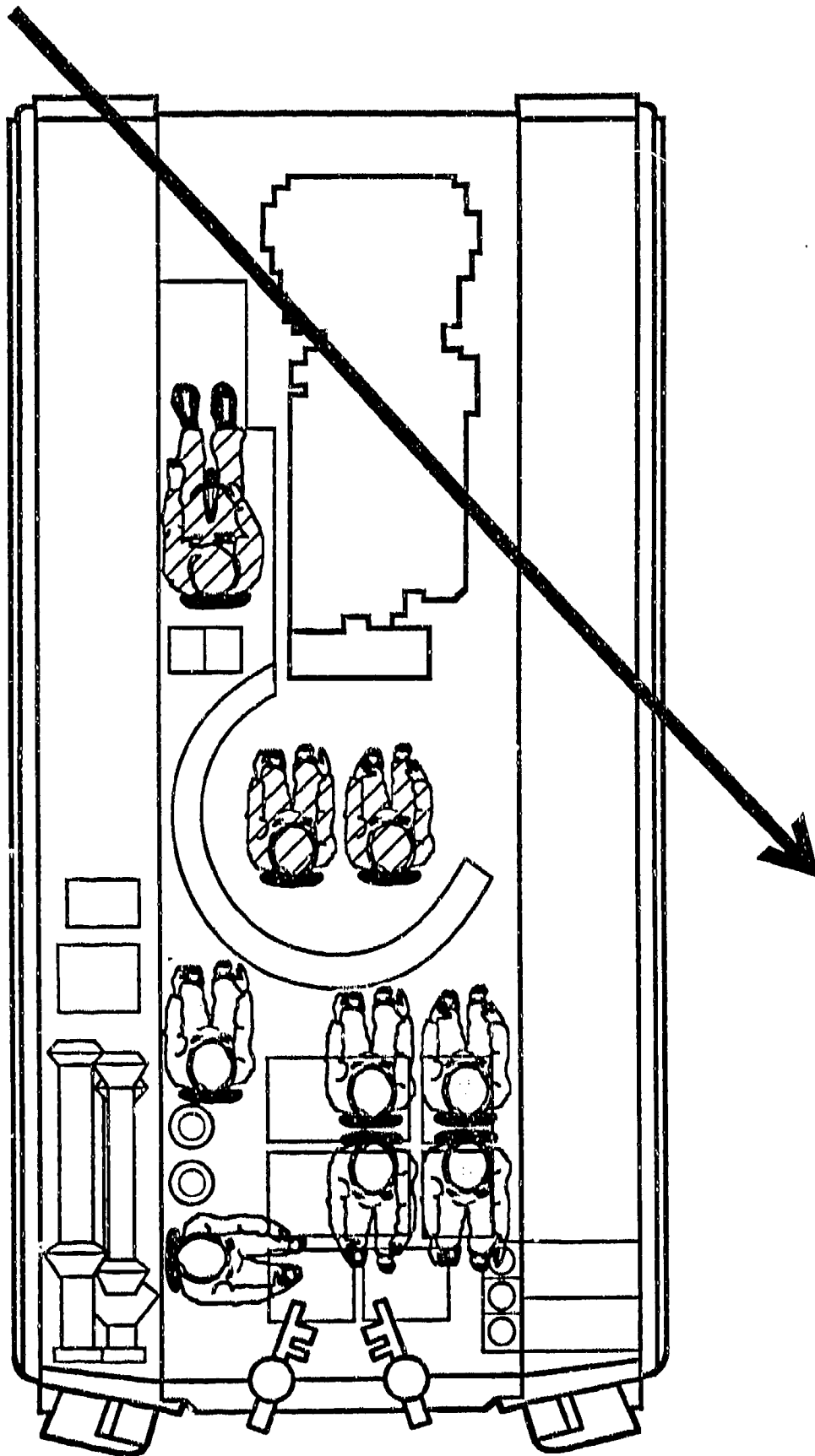
Figure 18

1. Right thigh contusion, right knee 2°sprain
2. Small fragment leg → RTD
3. Knee Sprain
4. No injuries
5. No injuries
6. No injuries
7. No injuries
8. No injuries
9. No injuries

Figure 18   47

B-21 (BFV diagram)
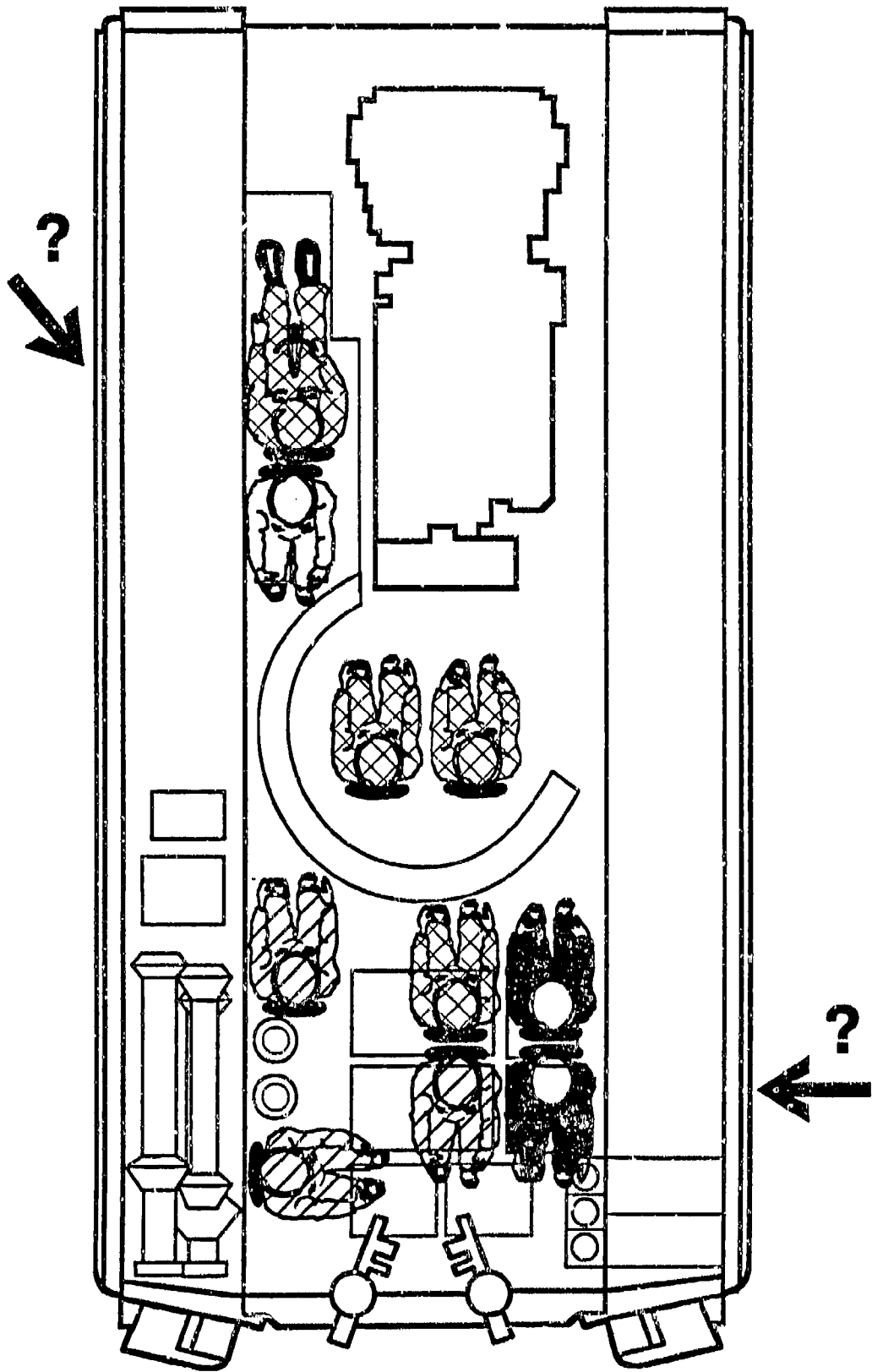
B-21 (Occupants diagram)

1. Facial burns

2. KIA

3. Burns to eyes

4. Extremity burns

5. Skull fracture and laceration

6. 2° burns to face, hands and right thigh, bilateral lower extremity soft tissue wounds

7. Bilateral lower extremity amputee → KIA

8. Pulmonary contusion

9. Pulmonary contusion

10. Burns → KIA

Figure 19   49

C-11 (BPV diagram)
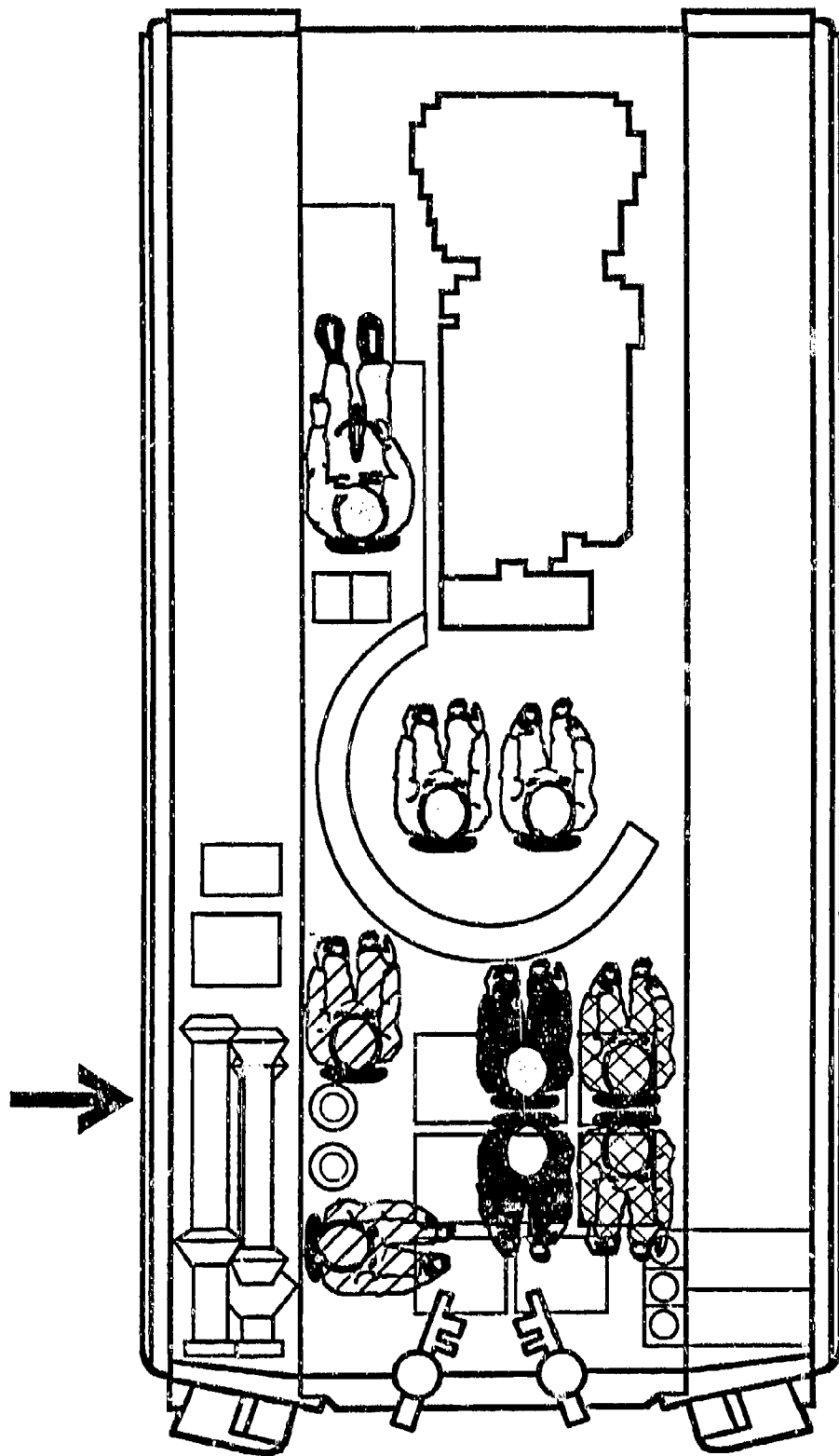
50   Figure 20

C-11 (Occupants diagram)

1. No injuries
2. No injuries
3. Contusion knee
4. Below right knee amputation
5. KIA
6. Burns → died of wounds
7. Below left knee amputation
8. Above right knee amputation → KIA
9. Burns

Figure 20   51

Figure 21

1. No injuries
2. Shrapnel wound to the chest
3. Multiple injuries → KIA
4. Multiple shrapnel wounds to shoulder and thigh
5. Multiple wounds → KIA

Figure 21   53

APPENDICES

2 AUGUST 1990   Iraq invaded Kuwait.

7 AUGUST 1990   President Bush ordered troops to Saudi Arabia.

8 AUGUST 1990   LTC Rodkey (LAIR MTR) and COL Slaughter (MRDC RAD II) discussed the possibility of a Combat Data Collection Team similar to the one used in Operation Just Cause.

17 AUGUST 1990   At MTR, certain individuals were identified for the project and began "POR." Forms were drafted.

18 SEPTEMBER 1990   MTR received a memorandum from HQ, MRDC which requested input for research teams to support Operation Desert Shield. LTC Rodkey (LAIR MTR) prepared a reply for HQ, MRDC.

21 NOVEMBER 1990   MTR received a memorandum from HQ, MRDC requesting comments on the proposed USUHS Casualty Data Form which the J-4 Medical Working Group was evaluating.

26 NOVEMBER 1990   MTR replied to HQ, MRDC listing reasons why USUHS form was inappropriate.

29 NOVEMBER 1990   Representatives from the Medical Working Group, J4, OTSG and MRDC met to discuss combat casualty data collection.

4 DECEMBER 1990   Per MAJ Calcagni, (MRDC RAD II) the USUHS proposal would probably not be accepted. MRDC OPS & RAD II were considering a team with a narrower focus than the USUHS proposal.

10 DECEMBER 1990

At MRDC HQ, LTC Rodkey (LAIR MTR), MAJ Uhorchak (LAIR MTR) and Ms Hunt (LAIR MTR) briefed COL McCarty (MRDC HQ), then went into a discussion group with COL Seng (MRDC RADII), COL Schnakenberg (MRDC RAD III), COL McMarlin (MRDC OPS), COL King (IDR), MAJ Calcagni (MRDC RAD II), MAJ Williams (MRDC OPS), MAJ Sanchez (WRAIR), LTC Collopy (MRDC RADII). COL McCarty (MRDC HQ) provided the following guidance: 1) if this were to be an MRDC project, it would be accomplished with a one page, back and front form; 2) major thrust would be combat casualty care data; 3) CW, BW, Laser, dental, and infectious disease information would be collected within confines of requirements 1 and 2. MAJ Sanchez (WRAIR) suggested some modifications for the form. COL King (IDR) was to FAX his suggestions.

12 DECEMBER 1990

MTR FAXED proposed form changes to COL King (IDR).

13 DECEMBER 1990

MTR FAXED proposed form changes to MAJ Sanchez (WRAIR). Both MAJ Sanchez (WRAIR) and COL King (IDR) FAXED MTR suggestions for the Casualty Collection Sheet.

14 DECEMBER 1990

MTR prepared a folder showing the development of the CDAT project for MG Travis (MRDC CDR) and COL Lewis (Pentagon), liaison to Dr. Collis (Deputy Assistant Secretary of Defense).

20 DECEMBER 1990

CPT Young (MRDC HQ) relayed a message from COL McMarlin (MRDC OPS). It appeared that the USUHS proposal had been accepted and that the team would be configured later.

27 DECEMBER 1990	COL McClinton (Dep CDR Admin LAIR) relayed a message from MRDC HQ that MRDC HQ had a 12 page memorandum concerning the Casualty Data Assessment Teams.
3 JANUARY 1991	LTC Collopy (RAD II MRDC) called MTR and explained the 12 page memorandum that he had been preparing. He asked for information, and MTR provided a re-statement of the briefing on 10 December 1990.
4 JANUARY 1991	LTC Collopy (MRDC RAD II) FAXED MTR the 12 page memorandum and COL Seng's (MRDC RAD II) draft memorandum from the 10 December 90 meeting.
9 JANUARY 1991	LTC Collopy (MRDC RAD II) FAXED MTR minor revisions of the information that MRDC HQ had provided the J4.
11 JANUARY 1991	LTC Collopy (MRDC RAD II) called MTR to report that J4 had not made a decision.
16 JANUARY 1991	Bombing of Baghdad begins.
18 JANUARY 1991	MRDC HQ phoned MTR to report that the USUHS Casualty Data Collection was dead, but that the LAIR proposal was still under consideration.
23 JANUARY 1991	LTC Collopy (MRDC RAD II) phoned MTR to report that the issue of combat casualty care had been resurrected, most likely as army only, medical only, and MRDC only. He stated that MAJ Williams (MRDC OPS) had been talking to MAJ Ayers (OTSG). LTC Rodkey (LAIR MTR) phoned MAJ Ayers (OTSG) to clarify the data form, and informed COL Corby (LAIR CDR) of the call to OTSG.

| 24 JANUARY 1991 | In an attempt to lay informed groundwork should a short-notice start be necessary, LTC Rodkey, MAJ Uhorchak, and Ms Hunt (all of LAIR MTR) discussed the number of people, team utilization, and logistics. |

25 JANUARY 1991   Possible team participants from LAIR were informed. COL McCarty (MRDC HQ) spoke with COL Peake (OTSG) who was trying to send a DEPMEDS/TAMMIS validation team as well as a casualty team into the Theater of Operations. OPS sent MTR a SECRET document showing the disposition of hospitals to assist in planning the casualty data collection.

30 JANUARY 1991   COL Seng (MRDC RAD II) visited LAIR, and saw the computer program and the classified hospital dispositions.

1 FEBRUARY 1991   0530 hrs PST, LTC Collopy (MRDC RADII) phoned LTC Rodkey (LAIR MTR) to say that the Casualty Data Assessment was dead.
1110 hrs PST, MAJ Williams (MRDC OPS) phoned LTC Rodkey (LAIR MTR) to say that COL McCarty (MRDC HQ) and MRDC OPS personnel felt that the issue should be addressed through MG Travis (MRDC CDR).
1415 hrs PST, MAJ Williams (MRDC OPS) and LTC Collopy (MRDC RADII) both telephoned with the same message. MG Travis (MRDC CDR) had walked into a meeting of COL McCarty (MRDC HQ), COL McMarlin (MRDC OPS), MAJ Williams (MRDC OPS), and LTC Collopy (RAD II MRDC). MG Travis (MRDC CDR) had spent about 30 minutes with them, had expressed interest, and had stated that MRDC should carry out the proposal. MG Travis (MRDC CDR) had spoken with BG Blanck (OTSG) to enlist his support. Rear Admiral Smyth (J4) was to be contacted the following Monday or Tuesday to obtain clearance to send a casualty collection team into country.

7 FEBRUARY 1991	LTC Collopy (MRDC RADII) FAXED MTR a copy of the letter from MG Travis (MRDC CDR) to COL Tsoulos (CENTCOM).
8 FEBRUARY 1991	MAJ Mason (MRDC), who was to hand-carry MG Travis's letter to COL Tsoulos (CENTCOM), phoned MTR to clarify some issues.
11 FEBRUARY 1991	LTC Beatson (OTSG) phoned MTR to determine if the casualty data collection form could be modified to capture information to validate DEPMEDS and/or TAMMIS. COL McMarlin (MRDC OPS) phoned MTR to say that MAJ Mason (MRDC) was enroute to Saudi, and that the plan appeared to be moving forward. COL McMarlin (MRDC OPS) phoned MTR later that afternoon expressing her concern that COL Corby (LAIR CDR) had told her that administrative personnel and logistical components of the Combat Casualty Plan were incomplete.
12 FEBRUARY 1991	COL Corby (LAIR CDR) told MAJ Uhorchak (LAIR MTR) that he was concerned that MRDC thought that the data collection team was ready to deploy at a moment's notice. COL Corby (LAIR CDR) directed MTR to draft an Operation Plan showing the function of the combat casualty assessment team.
13 FEBRUARY 1991	LTC Rodkey (LAIR MTR), MAJ Uhorchak (LAIR MTR), COL Corby (LAIR CDR), COL McClinton (LAIR Dep CDR Admin), COL Cole (LAIR Dep CDR Res), and MAJ Orthner (LAIR LOG) reviewed the Draft Operations Order. It was agreed that LAIR would forward the draft operations plan, but that all logistics, personnel, and other such issues necessary to deploy a team to Theater of Operations would be coordinated and executed by MRDC OPS.

14 FEBRUARY 1991   Draft Operation Plan with cover letter signed by COL Corby (LAIR CDR) was FAXED to MRDC HQ.

15 FEBRUARY 1991   1300 hrs EST COL Peake (OTSG), COL McMarlin (MRDC OPS), COL Slaughter (MRDC), LTC Keller (OTSG), LTC Beatson (OTSG), MAJ Ayers (OTSG), LTC Rodkey (LAIR MTR), and MAJ Uhorchak (LAIR MTR) attended a meeting at the OTSG to discuss whether the data form could collect DEPMEDS/TAMMIS data to validate some of the assumptions for MedForce 2000. COL Peake (OTSG) suggested an in-depth look at one MASH, CASH, or EVAC hospital in an attempt to evaluate DEPMEDS. COL McMarlin (MRDC OPS), LTC Rodkey (LAIR MTR), and MAJ Uhorchak (LAIR MTR) stated that the effort could probably be handled, although not as efficiently, with a smaller team of 16 people in Saudi Arabia, but fewer than 16 probably would not yield meaningful data. COL Peake (OTSG) was informed that MAJ Bowersox (LAMC) had a proposal to validate DEPMEDS, and MAJ Bowersox (LAMC) was asked to forward the proposal to COL Peake (OTSG). COL Peake (OTSG) suggested that a contingent team be prepared to go to Germany to interview patients there should Theater Clearance to Saudi Arabia be denied.

16 FEBRUARY 1991   COL Peake (OTSG) phoned LTC Rodkey (LAIR MTR). COL Tsoulos (OTSG) had developed a plan to place 30 researchers in the Theater to evaluate combat casualties, but the main obstacle appeared to be the cap on Theater personnel.

19 FEBRUARY 1991   MAJ Williams (MRDC OPS) phoned MTR conveying concern over the high cost of TDY to Europe. If the team deployed to Europe, it was to deploy with complete gear, prepared to redeploy to SWA. MAJ Ayers (OTSG) called

MTR stating that cost was to be resolved with OPS at
MRDC. MAJ Williams (OPS MRDC) phoned MTR stating
that several issues should be addressed with LTC Chastain
(MRDC Info Mgt) in regard to the computer list that Ms
Hunt (LAIR MTR) had developed. Also, the equipment list
had to be redefined for a 16 person team in Europe versus a
30 person team in SWA. A 4 man "advance party" to
Europe was also being considered as it could be funded for
approximately $25,000.

20 FEBRUARY 1991   MAJ Williams (MRDC OPS) phoned MTR stating that MG
Travis (MRDC CDR) had talked to BG Blanck (OTSG) the
previous afternoon, and that the issue was dead. However,
COL Holland, (MRDC CoS) stated that more recent
information indicated that the issue was still under
consideration.

21 FEBRUARY 1991   Team alerted for orders to Germany to collect information
from wounded who have been evacuated.

25 FEBRUARY 1991   Travel orders issued to SGT Hoxie (LAIR MTR), MAJ
Uhorchak (LAIR MTR), CPT Young (MRDC HQ), and MAJ
Berry (MRDC HQ).

28 FEBRUARY 1991   Team arrived in Frankfort, Germany.

1 MARCH 1991   Team departed for the various hospitals where they collected
data on the wounded. (This aspect is detailed in the
appendices prepared by the individual members of the team.)

14 MARCH 1991   Team departed Germany for United States.

1 Interview / Review   Time/Date of interview/review_____   Interviewer _____

2 PATIENT INFORMATION-

3 Last name:_____ First Name:_____   [ID#]_____

4 SSN _____   Sex___   Bdate _____

5 Race _____   Height_____   Weight_____

6 Branch of Service: 1. Army   2. Navy   3. Air Force   4. Marine   5. Other_____

7   Grade/Rank_____   MOS_____   Unit/Org_____

8 Date Arrived in Combat Zone (dd/mm/yr) _____

9 Time/Date of injury (mil.local hrs, dd/mm/yr) _____

10 Place of injury: 1.Urban   2.Suburb   3.Countryside   4.Desert   5.Beach

11 State of mind when injured: 1.Scared   2.Tired   3.Enthusiastic   4.Confident

12 Hostile: Y / N   Type:_____

13 Armor: Y / N   If yes: Inside / Outside

14 INJURY-

15 I. Combat: A. Wounded in Action   B. Died Of Wound   C. Combat Stress

16 Mechanism-

17   1. GSW   2. Frag   3. Burn   4. Jump   5. CW   6. Spall   7. AirCrash   8.Accident

18   _____%   Type_____

19 II. Noncombat: D. Disease/Illness   E. Nonbattle

20 specify-   _____   _____

21 Anatomy Injured*:   1._____   2._____   3._____   4._____   5._____

22 Type of Injury**:   1._____   2._____   3._____   4._____   5._____

23 Clinical impression of shock:

24   1. Present   2. Not Present   3.Unknown

25 Mental Status:

26   1. Normal   2. Resp. to Verbal Stimuli   3. Responds to Pain   4. Unresponsive

27 Projectile type?   1. <50 cal   2. ≥50 cal   3. Fragments   4. Unknown

28   distance?   1. <50 m   2. 50-100 m   3. 100-1000 m   4. >1000 m   5. Unknown

29 **BODY ARMOR**   **HITS**   **PENETRATION**

30 Helmet   Y / N   Y / N   Y / N   MOPP   Y / N

31 Vest   Y / N   Y / N   Y / N   Armor Ensemble (A/E)   Y / N

32 Eye   Y / N   Y / N   Y / N   A/E Gloves   Y / N

*ANATOMY INJURY KEY							**TYPE OF INJURY	
Upper Extremity	10	Lower Extremity	20	Trunk	30	Head	40	Bone (T)	1
Shoulder	11	Hip	21	Neck-Front	31	Eye	41	Soft Tissue (S/T)	2
Arm	12	Thigh	22	Neck-Back	32	Nose	42	Nerve (N)	3
Elbow	13	Knee	23	Chest-Front	33	Mouth	43	Vessel (V)	4
Forearm	14	Leg	24	Chest-Back	34	Ear	44	Bone+S/T	5
Wrist	15	Ankle	25	Abdomen-Front	35	Brain	45	Bone+Nerve	6
Hand	16	Foot	26	Abdomen-Back	36			Bone+Vessel	7
				Pelvis-Front	37			Bone+N+V	8
				Pelvis-Back	38			Organ	9
				Spine	39				
LEFT	0.1	RIGHT	0.2						

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TREATMENT	INITIAL	NEXT	NEXT	NEXT	NEXT
Date: (dd/mm/yy) Time:(mil local hr)					
Evac method liter(L) / Ambulatory(A)					
Evac to					
Evac priority					
Treated by					
Type of Treatment if surgical-duration (min)					
Injury Classification					
Fluid: Type	Y/N: Crys/Bld	Y/N: Crys/Bld	Y/N: Crys/Bld	Y/N: Crys/Bld	Y/N: Crys/Bld
Amount given: preadmiss. presurgery intra/post surgery					
Antibiotics/Type	Y / N	Y / N	Y / N	Y / N	Y / N
Pain Meds./Type	Y / N	Y / N	Y / N	Y / N	Y / N
BP / RR / HR Temp / Hct Urine (Specific Gravity)					
COMMENTS: [ISS/TISS]					

Return to Duty: Y / N   If yes: in Theater / OCONUS / CONUS

Evac Method	Evac to	Evac Priority	Treated by	Type of Treatment	Injury Classif.
Manpower Asset 1. Wheel 2. Track 3. Rotary Wing 4. Fixed Wing *Medical Asset* 5. Wheel 6. Track 7. Rotary 8. Fixed 9. Other (specify_____)	1. Battalion Aid Station 2. Med Co/Bde/Div Collection Point 3. FAST/MASH 4. CSH 5. Field Hospital 6. Evac Hospital 7. General Hospital 8. Hospital Ship 9. Fixed (where_____)	1. Urgent (<2 hrs) 2. Priority (2-4 hrs) 3. Routine (4-24 hrs)	1. Self 2. Buddy 3. Medic 4. PA 5. Nurse 6. MD	1. Pressure Bandage 2. CPR 3. IV 4. Tourniquet 5. Splint 6. Backboard Spinal 7. Chest Tube 8. Debridement 9. Surgical, Major 10. Orth., Major 11. External Fixator	1. Ambulatory 2. Delayed 3. Immediate 4. Urgent 5. Expectant

If Found, please return to: COMMANDER
                              ATTN: SGRD-ULY-MT
                              LETTERMAN ARMY INSTITUTE OF RESEARCH
                              PRESIDIO OF SAN FRANCISCO, CA 94129-6800

66

LAIR/MTR, rev 5.2, 22 February 1991   CASUALTY DATA ASSESSMENT FORM   02254

1. Interview   Y / N   DTG of interview_____   Data Recorder_____
2. **PATIENT INFORMATION-**
3. Last name:_____   First name:_____   [ID#]_____
4. SSN _____   Sex__   Bdate _____
5. Race: 1.Cauc 2.Black 3.Hisp 4.NatAm 5.Asian 6.Other_____   Ht(in)_____   Wt(lbs)_____
6. Branch of Service: 1.Army   2.Navy   3.Air Force   4.Marine   5.Other_____
7.   Grade/Rank_____   MOS_____   Armor Vch#_____   Co._____   Bn._____   Div._____
8. Date Arrived in Theater (dd/mm/yr) _____
9. Previous Heat Injury: Y / N   DTG last meal _____   Sleep in last 24hrs (hours)_____
10. Smoker: Y / N   Date of last illness_____   Fluid in last 24hrs (quarts)_____
11. DTG OP commenced in which injured _____   DTG of injury/illness_____
12. Place of injury/illness: 1.Urban   2.Suburb   3.Countryside   4.Desert   5.Beach
13. Battle Injury: Y / N   1.Offense 2.Defense 3.Rear Area 4.Other_____   Armor: Y / N - If yes: Inside / Outside
14. Init. Clinical Impression of shock: Y / N / Unknown
15. Init. Neurologic Status: 1. Normal   2. Resp.Verb.Stimuli   3. Responds to Pain   4. Unresponsive
16. Projectile type?   1. <50 cal   2. ≥50 cal   3. Fragments   4. Unknown
17.   distance?   1. <50 m   2. 50-100 m   3. 100-1000 m   4. >1000 m   5. Unknown
18. **BODY ARMOR**   **HITS**   **PENETRATION**
19. Helmet   Y / N   Y / N   Y / N   MOPP (Level_____)   Y / N
20. Vest   Y / N   Y / N   Y / N   Armor Ensemble (A/E)   Y / N
21. Eye   Y / N   Y / N   Y / N   A/E Gloves   Y / N
22. **CW/BW:**   Y / N   Type _____   DTG Exposed_____
23. Pyridostigmine Y / N   DTG_____   Dose_____
24. Convulsion   Y / N   CANA: Y / N   DTG_____   Dose_____
25. # AutoInjectors Used_____   Time to Blister(min)_____   Decon: Y / N   Skin Protectant: Y / N
26. **INJURY/ILLNESS** Code from   (←Most Severe   Least Severe→)
27. Anatomy Involved: (A)   1._____ 2._____ 3._____ 4._____ 5._____
28. Organ Involved: (B)   1._____ 2._____ 3._____ 4._____ 5._____
29. Tissue Involved: (C)   1._____ 2._____ 3._____ 4._____ 5._____
30. Type of Inj/Illness: (D)   1._____ 2._____ 3._____ 4._____ 5._____
31. Mechanism: (E)   1._____ 2._____ 3._____ 4._____ 5._____
32. Burn: 1st°__% 2nd°__% 3rd°__%   1.__-__ 2.__-__ 3.__-__ 4.__-__ 5.__-__

(A) ANATOMY INVOLVED		Left	0.1	Right	0.2	(B) ORGAN		(C) TISSUE		(D) TYPE		(E) MECHANISM	
Up Ext	10	Trunk	30	Head	40	Brain	50	Bone (B)	70	Ammunition	80	GSW	100
Shoulder	11	Neck-Front	31	Face	41	Teeth	51	Soft Tissue (S/T)	71	Burn	81	Frag	101
Arm	12	Neck-Back	32	Zygoma	42	Lung	52	Nerve (N)	72	Pene/Perfor.	82.3/82.4	Spall	102
Elbow	13	Thorax-Front	33	Maxilla	43	Heart	53	Vessel (V)	73	Laceration	83	Thermal	103
Forearm	14	Thorax-Back	34	Mandible	44	Stomach	54	Bone + S/T	74	Contusion/Crush	84.3/84.4	Jump	104
Wrist	15	Abd-Front	35	Oral	45	Duodenum	55	Bone + Nerve	75	Sprain/Strain	85.3/85.4	Aircraft	105
Hand	16	Abd-Back	36	Eye	46	Sm. Intestines	56	Bone + Vessel	76	UpRI/LowRI	86.3/86.4	Veh. Acc.	106
Digits	17	Pelvic-Front	37	Ear	47	Colon	57	Bone + N + V	77	UpGI/LowGI	87.3/87.4	Environ	107
Low Ext	20	Pelvic-Back	38	Nose	48	Liver	58	Ligament	78	Heat/Cold	88.3/88.4	CW	108
Hip	21					Spleen	59	Tendon	79	GU/VD	89.3/89.4	BW	109
Thigh	22	Spine	0.5			Pancreas	60			From Unk Orig	90	Laser	110
Knee	23					Kidney	61	Dermatologic	91	Surgical	92	Disease	111
Leg	24					Bladder	62	Medical	92	Oral/Dental	94	NB Inj	112
Ankle	25					Ureter/Urinary	63	Opth Injury/Illness	95.3/95.4	F-Up/Other	96	Blast	113
Foot	26					Penis/Testis	64	Psych/Cbt Stress	97.3/97.4				

Name (Last, First) _____ , _____ SSN _____ - ____ - ____

	TREATMENT (Code From)	INITIAL	NEXT	NEXT	NEXT	NEXT
1	TREATMENT (Code From)	INITIAL	NEXT	NEXT	NEXT	NEXT
2	DTG					
3	MTF (type/unit #) (F)					
4	Evac method (G)					
5	Time (min)					
6	Triage Classification (H)					
7	Treated by (I)					
8	Type of Treatment (J)					
9	if surgical-duration (min)					
10	Type of Anesthesia	Gen/Spinal/Reg	Gen/Spinal/Reg	Gen/Spinal/Reg	Gen/Spinal/Reg	Gen/Spinal/Reg
11	admin by (I)					
12	Fluid: Type	Y / N: Cry / Col / Bld	Y / N: Cry / Col / Bld	Y / N: Cry / Col / Bld	Y / N: Cry / Col / Bld	Y / N: Cry / Col / Bld
13	Amount given:					
14	preadmiss.	/ /	/ /	/ /	/ /	/ /
15	presurgery	/ /	/ /	/ /	/ /	/ /
16	intra/post surgery	/ /	/ /	/ /	/ /	/ /
17	Antibiotics/Type	Y / N	Y / N	Y / N	Y / N	Y / N
18	dose/duration					
19	Pain Meds./Type	Y / N	Y / N	Y / N	Y / N	Y / N
20						
21	Blood Pressure					
22	HR | RR	—+—	—+—	—+—	—+—	—+—
23	Hct | Temp					
24	Urine (Specific Gravity)					
25	Infection	Y / N	Y / N	Y / N	Y / N	Y / N
26	Anatomy Inv. (line 27-front, 1-5)					
27	DTG Culture/Organism					
28	Disposition/DTG (K)/	/	/	/	/	/
29	COMMENTS:					
30	[ISS/TISS]					
31	Diagnosis:					
32	Photo Y / N					

(F) MTF - (Medical Treatment Facility)	(G) Evac Method	(H) Triage Classif.	(I) Treated by	(J) Type of Treatment	(K) Disposition
1. Battalion Aid Station (unit #) 2. Med Co/Bn/Div Collection Point (unit #) 3. FAST/MASH (unit #) 4. CSH (unit #) 5. Field Hospital (unit #) 6. Evac Hospital (unit #) 7. General Hospital (unit #) 8. Hospital Ship (name) 9. Fixed (where _____)	Non-med Assets 1. Wheel 2. Track 3. Rotary Wing 4. Fixed Wing Medical Assets 5. Wheel 6. Track 7. Rotary Wing 8. Fixed Wing 9. Other (specify _____)	1. Urgent 2. Immediate 3. Delayed 4. Ambulatory /Minimal 5. Expectant	1. Self 2. Buddy 3. Medic 4. PA 5. Nurse 6. MD/DO 7. DDS/DMD Anesthesia by 8. CRNA 9. Anesthesiologist 10. Oper. Surgeon	1. Pressure Bandage 2. CPR 3. IV 4. Tourniquet 5. Splint 6. Backboard Spinal 7. Chest Tube 8. Debridement 9. External Fixator 10. Nursing Care 11 SURGERY 11.1 General 11.2 Orthopedics 11.3 Cardio-Thoracic 11.4 Neurology 11.5 Urology 11.6 GYN 11.7 ENT 11.8 Ophthalmology 11.9 Max-Fac	1. Return to Duty 2. Retain @ MTF 3. Evacuated 4. Died of Illness 5. Died of Wound

If this form is found outside the THEATER OF OPERATION DESERT STORM, immediately return to:

COMMANDER, ATTN: SGRD-ULY-MT

LETTERMAN ARMY INSTITUTE OF RESEARCH, PRESIDIO OF SAN FRANCISCO, CA 94129-6800

OPORD 1

References: Map Sheets

Time Zone Used Throughout the Order: ZULU

Task Organization: Annex A (Task Organization)

1.   SITUATION

   a.   Enemy Forces. (See Current INTELSUM)

   b.   Friendly Forces.

      44th Med Bde provides medical support to VII US and XVIII US Corps
units as directed in Operation Desert Storm.

   c.   Attachment and Detachments. None.

   d.   Assumption. Medical support for each major combat unit consists of a
MASH, CSH, and 2 EVAC's. Evacuations from the supporting EVAC's will flow to
larger major collections of hospitals ("nodal points") in the commz.

2.   MISSION

      The Casualty Data Assessment Team (CDAT) will collect pertinent data related to
the care and medical management of combat casualties. This team will collect data
specifically related to physical (mechanical) trauma but will also collect information on
other types of trauma when they are combined with mechanical trauma. Data will be
critically analyzed searching for ways to alleviate injuries and to provide a more rapid
return to duty for injured soldiers.

3. EXECUTION

a. Concept of Operation. On order CDAT will deploy to Fort _____ for a 3 day period of training followed by subsequent deployment to Theater of Operation Desert Storm. Once in the Theater the command and analysis element will locate in Riyadh and establish a base of operation. Research elements 1 thru 12 will be attached to selected evacuation hospitals for the collection of combat casualty data. Research elements will collect the data using CDAT Form (see Annex B). The research elements will be deployed on the following basis. One research element will be attached to one of the evacuation hospitals for each of the major units. (1AD, 3AD, 1ID, 24ID, 101AD, 1CD, 2ACR, 3ACR). This will provide a sample of all types of units, and it will also sample the units most heavily engaged through the least heavily engaged. The four remaining teams will be attached to the "nodal point" evacuation hospitals. This will provide an additional source to initially enter patients into the survey and will allow a percentage of those already surveyed to be further evaluated through a greater time within the evacuation chain.

b. Command and analysis element. Command and analysis (C&A) element will establish a base of operations in Riyadh, at a facility capable of providing constant, reliable power to operate a local area network with one server and three computer work stations. The C&A element will input data as received from the research elements. Using an established DBase IV data file, they will analyze those factors which may more expeditiously return soldiers to combat. The C&A element will establish contact with the central TAMMIS, MedPar operation center to link the data obtained from MedPar with the data obtained via the CDAT form. Appropriate patient ID numbers from MedPar will be entered into each CDAT Form in line 3. Once trends are identified, they will be analyzed to see if they are true trends of statistical significance or just isolated variations of injury patterns. C&A element will be responsible for providing daily summaries. They will also be responsible for publishing the final after action analysis report.

c. Research elements 1-12. See Annex A for individual element assignments.

d.   Coordinating instructions.

(1)   Each research element 1 thru 12 is attached to an evac hosp as per Annex C for rations, lodging, transportation, etc.   Each research element will be issued a block of 1000 sequential control numbered cards. This control numbering is to maintain accountability and monitor element efficiency. Once the elements have established themselves at the evacuation hospital, they will begin filling out the casualty data assessment cards by interviewing as many injured patients as possible to obtain the information on page one. A chart review will be necessary to obtain the information for page two. Special attention will be directed to reviewing the charts of those who subsequently die of wounds (DOW). If all the casualties cannot be surveyed, then it is the research element leader's responsibility to insure that those injured soldiers who are surveyed reflect the spectrum and appropriate percentage or the total casualty load.

(2)   Handling of the cards. The individual researchers will maintain possession of the cards at all times. During their daily rounds, any new surgical interventions or major changes in patient status will be annotated. Once the patient has been returned to duty or is transferred back in the evacuation chain to another hospital, the card will be pulled from the active file and forwarded to the C&A element for data entry and subsequent analysis.

(3)   Photos. In as many cases as possible, wounds will be photographed, both pre- and post-operatively. Each photo will have a card showing the patient's Social Security Number and a ruler to provide size relationship and orientation. Exposed rolls of film will be forwarded to the C&A element for storage.

(4)   Data collected will be treated confidentially as any other patient data and as such will not be discussed openly to unauthorized persons. Material may be discussed with the host hospital commander, the medical staff attending the patient, or other members of the research team. Research elements are not to release specific patient information to any other parties.

(5)   The elements are not for use at the discretion of the host hospital commander. Their sole function is to collect casualty data. However, they will be

required to participate to the same level as assigned personnel, in the assembly and disassembly of the hospital and preparation of living and protective areas during deployment of their hospital. They will make every effort to collect the data, however, they will not interfere in patient care.

(6)   Research elements need to be prepared to displace on order of the C&A element commander if necessary to cover other parts of the medical evacuation route that may be seeing higher patient flow in order to more adequately survey the casualties in the Theater.

4.   SERVICE SUPPORT

a.   Each member of the team will deploy with their individual gear (Annex C) and their CTA 50. This will include MOPP protective gear, individual protective mask, helmets and kevlar vest. Weapons will be drawn from _____ on arrival in Theater.

b.   Research elements will be attached to the respective evacuation hospitals for rationing, lodging, and transportation.

c.   Equipment requirements, for the CDA Team (See Annex D).

5.   COMMAND AND SIGNAL

a.   Signal

b.   Command & Control, LTC Rodkey, Commander, _____, Riyadh.

Annex A - Task Organization

Command and Analysis Element

Commander, LTC, VC
Medical Data Analysis/ISS Coding - COL, MC
Medical Data Analysis/ISS Coding - MAJ, MC
Computer Analysis/Statistician, DAC, GS-12
Computer Operator, SGT 01H
Computer Operator, SGT CMF 91

Research Elements

	Officer	NCO/Enlisted		Assignment
1.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
2.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
3.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
4.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
5.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
6.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
7.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
8.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
9.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
10.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
11.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA
12.	(AMEDD Professional*)	SFC/SSG/SGT	CMF 91	TBA

*Prefered Rank Order for AMEDD Professional Research Element Leader

1. MC (any)
2. DC (Oral Surgeon)
3. ANC
4. VC (Experienced Biomedical Research)
5. MSC (68-Research)

1 Interview Y / N DTG of interview_____ Data Recorder_____

2 **PATIENT INFORMATION**-

3 Last name:_____ First name:_____ [ID#]_____

4 SSN _____ Sex__ Bdate _____

5 Race: 1.Cauc 2.Black 3.Hisp 4.NatAm 5.Asian 6.Other_____ Ht(in)_____ Wt(lbs)_____

6 Branch of Service: 1.Army 2.Navy 3.Air Force 4.Marine 5.Other_____

7 Grade/Rank_____ MOS_____ Armor Veh#_____ Co._____ Bn._____ Div._____

8 Date Arrived in Theater (dd/mm/yr) _____

9 Previous Heat Injury: Y / N DTG last meal _____ Sleep in last 24hrs (hours)_____

10 Smoker: Y / N Date of last illness _____ Fluid in last 24hrs (quarts)_____

11 DTG OP commenced in which injured _____ DTG of injury/illness_____

12 Place of injury/illness: 1.Urban 2.Suburb 3.Countryside 4.Desert 5.Beach

13 Battle Injury: Y / N 1.Offense 2.Defense 3.Rear Area 4.Other_____ Armor: Y / N - If yes: Inside / Outside

14 Init. Clinical Impression of shock: Y / N / Unknown

15 Init. Neurologic Status: 1. Normal 2. Resp.Verb.Stimuli 3. Responds to Pain 4. Unresponsive

16 Projectile type? 1. <50 cal 2. ≥50 cal 3. Fragments 4. Unknown

17 distance? 1. <50 m 2. 50-100 m 3. 100-1000 m 4. >1000 m 5. Unknown

18 **BODY ARMOR** **HITS** **PENETRATION**

19 Helmet Y / N Y / N Y / N MOPP (Level____) Y / N

20 Vest Y / N Y / N Y / N Armor Ensemble (A/E) Y / N

21 Eye Y / N Y / N Y / N A/E Gloves Y / N

22 **CW/BW:** Y / N Type _____ DTG Exposed_____

23 Pyridostigmine Y / N DTG_____ Dose_____

24 Convulsion Y / N CANA: Y / N DTG_____ Dose_____

25 # AutoInjectors Used_____ Time to Blister(min)_____ Decon: Y / N Skin Protectant: Y / N

26 **INJURY/ILLNESS** Code from (←Most Severe Least Severe→)

27 Anatomy Involved: (A) 1._____ 2._____ 3._____ 4._____ 5._____

28 Organ Involved: (B) 1._____ 2._____ 3._____ 4._____ 5._____

29 Tissue Involved: (C) 1._____ 2._____ 3._____ 4._____ 5._____

30 Type of Inj/Illness: (D) 1._____ 2._____ 3._____ 4._____ 5._____

31 Mechanism: (E) 1._____ 2._____ 3._____ 4._____ 5._____

32 Burn: 1st°_% 2nd°_% 3rd°_% 1._-_-_ 2._-_-_ 3._-_-_ 4._-_-_ 5._-_-_

(A) ANATOMY INVOLVED		Left	0.1	Right	0.2	(B) ORGAN		(C) TISSUE		(D) TYPE		(E) MECHANISM	
Up Ext	10	Trunk	30	Head	40	Brain	50	Bone (B)	70	Amputation	80	GSW	100
Shoulder	11	Neck-Front	31	Face	41	Tooth	51	Soft Tissue (S/T)	71	Burn	81	Frag	101
Arm	12	Neck-Back	32	Zygoma	42	Lung	52	Nerve (N)	72	Pentr/Prfor	82.3/82.4	Spall	102
Elbow	13	Thorax-Front	33	Maxilla	43	Heart	53	Vessel (V)	73	Laceration	83	Thermal	103
Forearm	14	Thorax-Back	34	Mandible	44	Stomach	54	Bone+S/T	74	Contusion/Crush	84.3/84.4	Jump	104
Wrist	15	Abd.-Front	35	Oral	45	Duodenum	55	Bone+Nerve	75	Sprain/Strain	85.3/85.4	Aircrash	105
Hand	16	Abd.-Back	36	Eye	46	Sm. Intestine	56	Bone+Vessel	76	UpRI/LowRI	86.3/86.4	Veh Acc	106
Digits	17	Pelvis-Front	37	Ear	47	Colon	57	Bone+N+V	77	UpGI/Diarrhea	87.3/87.4	Environ	107
Low Ext	20	Pelvis-Back	38	Nose	48	Liver	58	Ligament	78	Heat/Cold	88.3/88.4	CW	108
Hip	21					Spleen	59	Tendon	79	GU/VD	89.3/89.4	BW	109
Thigh	22	Spine	0.5			Pancreas	60			Fever Unk Orig	90	Laser	110
Knee	23					Kidney	61	Dermatologic	91	Surgical	92	Decon	111
Leg	24					Bladder	62	Medical	93	Oral/Dental	94	NB Inj	112
Ankle	25					Uterus/Ovary	63	Opth Injury/Illness	95.3/95.4	F-Up/Other	96	Blast	113
Foot	26					Penis/Testis	64	Psych/CDs Stress	97.3/97.4				

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Name (Last, First)_____ _____   SSN_____

#	TREATMENT (Code From)	INITIAL	NEXT	NEXT	NEXT	NEXT
2	DTG					
3	MTF (type/unit #) (F)					
4	Evac method (G)					
5	Time (min)					
6	Triage Classification (H)					
7	Treated by (I)					
8	Type of Treatment (J)					
9	If surgical-duration (min)					
10	Type of Anesthesia	Gen/Spinal/Reg	Gen/Spinal/Reg	Gen/Spinal/Reg	Gen/Spinal/Reg	Gen/Spinal/Reg
11	admin by (I)					
12	Fluid: Type	Y / N: Cry / Col / Bld	Y / N: Cry /Col / Bld	Y / N: Cry / Col / Bld	Y / N: Cry / Col / Bld	Y / N: Cry / Col / Bld
13	Amount given:					
14	preadmiss.	/ /	/ /	/ /	/ /	/ /
15	presurgery	/ /	/ /	/ /	/ /	/ /
16	intra/post surgery	/ /	/ /	/ /	/ /	/ /
17	Antibiotics/Type	Y / N	Y / N	Y / N	Y / N	Y / N
18	dose/duration					
19	Pain Meds./Type	Y / N	Y / N	Y / N	Y / N	Y / N
20						
21	Blood Pressure					
22	HR BR					
23	Hct Temp					
24	Urine (Specific Gravity)					
25	Infection	Y / N	Y / N	Y / N	Y / N	Y / N
26	Anatomy Inv. (line 27-front, 1-5)					
27	DTG Culture/Organism					
28	Disposition/DTG (K)/	/	/	/	/	/
29	COMMENTS:					
30	[ISS/TISS]					
31	Diagnosis:					
32	Photo Y / N					

(F) MTF - (Medical Treatment Facility)	(G) Evac Method	(H) Triage Classif.	(I) Treated by	(J) Type of Treatment		(K) Disposition
1. Battalion Aid Station (unit #) 2. Med Co/Bde/Div Collection Point (unit #) 3. FAST/MASH (unit #) 4. CSH (unit #) 5. Field Hospital (unit #) 6. Evac Hospital (unit #) 7. General Hospital (unit #) 8. Hospital Ship (name) 9. Fixed (where_____)	Maneuver Area 1. Wheel 2. Track 3. Rotary Wing 4. Fixed Wing Medical Area 5. Wheel 6. Track 7. Rotary Wing 8. Fixed Wing 9. Other (specify)	1. Urgent 2. Immediate 3. Delayed 4. Ambulatory /Minimal 5. Expectant	1. Self 2. Buddy 3. Medic 4. PA 5. Nurse 6. MD/DO 7. DDS/DMD Anesthesia by 8. CRNA 9. Anesthesiologist 10. Oper. Surgeon	1. Pressure Bandage 2. CPR 3. IV 4. Tourniquet 5. Splint 6. Backboard Spinal 7. Chest Tube 8. Debridement 9. External Fixator 10. Nursing Care	11 SURGERY 11.1 General 11.2 Orthopaedics 11.3 Cardio-Thoracic 11.4 Neurology 11.5 Urology 11.6 GYN 11.7 ENT 11.8 Ophthalmology 11.9 Max-Fac	1. Return to Duty 2. Remain @ MTF 3. Evacuated 4. Died of Illness 5. Died of Wound

If this form is found outside the THEATER OF OPERATION DESERT STORM, immediately return to:
      COMMANDER, ATTN: SGRD-ULY-MT
      LETTERMAN ARMY INSTITUTE OF RESEARCH, PRESIDIO OF SAN FRANCISCO, CA 94129-6800

LAIRIMTR

CASUALTY DATA ASSESSMENT FORM

PAGE 1: The collection of combat casualty data is very important to the US Army Medical Department. It is through this data that efficacy of our procedures of evacuation and treatment can be ascertained. Thus it is very important to obtain as much of the information requested as possible. If you are the first person to interview a patient, try to reconstruct as much of the events as possible. Do not be afraid of placing notes in any of the margins of this form!

DTG used throughout the form is the standard military Date Time Group: eg., 1305hrs on 16 Jan 90 = 161305Jan90.

For completion of the form, only the entries that may not be self explanatory are addressed.

Line 1: "Interview/review records". Was this a personal interview with a patient or was this a review of his medical records?

Line 3: [ID#] Leave blank

Line 4-12: Self explanatory

Line 13: Was this injury due to hostile action? Was the patient an armor vehicle crewman, artilleryman, or part of a mech infantry squad that normally rides in an armored vehicle? When injured was he inside the vehicle or outside the vehicle?

Line 18-21: This series of questions determines the following: was the helmet, vest, and/or eye protection being worn, was that item hit and if hit was the device penetrated? MOPP=was the MOPP suit on? Armor ensemble=was the flame retardant combat vehicular crewman's ensemble on at the time of injury? A/E gloves=were the flame retardant gloves being worn when injured?

Line 22: CW/BW=Chemical Warfare/Biological Warfare. Enter type of agent if known.

Line 23: Was the pyridostigmine pretreatment given? List time given and dose.

Line 24: CANA=Valium

Line 26-30: Use the table at the bottom of the page to code EACH injury. Line 27-Anatomy=area injured, wounded, burned, entry site of any penetrating wound. Line 28-List any organ injured. Extremity injuries will probably not have an entry on Line 28 but will have an entry on Line 29. Injuries involving organs will probably not need a tissue entry on Line 29. Line 31-GSW=Gunshot wound; Frag=fragments from grenades, artillery or bombs; Spall=fragmentation injuries sustained INSIDE an armored vehicle; Thermal=burns from any source except chemical warfare blisters; Jump=airborne/air assault injuries; Environ=heat, cold and animal bites; NBInj=nonbattle injury.

In this section, EACH injury will have entries in line 27,30,31 and either 28 or 29 (occasionally both). Line 32 is for use if that part is burned. As a guide the palm of the hand = 1% of total body surface; 12 "Palms" of burn area=12%.

PAGE 2: The table on this page is to track the patient's care and evacuation through the medical system. The "Initial" column will most likely be reconstructed from interviews and the patient's records. This care is most likely to be at the Bn Aid Station. The "Next" column represents the next level of care that the patient is evacuated to OR the next operative procedure if the patient remained at the same location.

Line 2-11: The codes to use in these lines correspond to the "KEY" table on the bottom of the page.

Line 8: List all types of treatment. If operated on by a General surgeon and an Orthopaedic surgeon, list both surgeries and the time for each in line 9. Ex. 11.1 11.2

78 min 47 min

Line 10: Type of Anesthesia Gen=General; Spinal=spinal; epidural etc; Regional=peripheral nerve blocks.

Line 11: CRNA=Certified Registered Nurse Anesthetist. "Oper surgeon"=use this if the surgeon doing the surgery also performed the anesthesia (usually a regional block).

Line 12: Were intravenous fluids given? Cry=Crystalloids such as Lactated ringer's or normal saline solutions. Col=Colloids such as Albumin, Hespan. Bld=Blood (Usually describes number of units given)

Line 13-16: Fluids are usually given in cc/hr or ml/hr. This rate times the number of hours the patient has been getting fluids will equal the total number of cc's of fluid that the patient has received. EX:(125cc/hr X 10hrs = 1250cc of fluid). Patient 1 receives 2500cc of Lactated Ringers, 500cc Albumin, and 2uts of blood. This would be coded 2500/500/2. Patient 2 receives 1200cc of LR and no other fluids, this would be coded 1200/0/0.

Line 17-18: Were antibiotics given? The most common are: PCN=penicillin, Cef=Cefadyl, Gen=Gentamicin, Vanc=Vancomycin. Other that may be used are Ancef, Fladgyl, Rocephin and Cleocin=clindomycin.

Line 19-20: Were pain medicines given? Most common will be Morphine or Demerol.

Line 21: BP=blood pressure, written as 120/60.

Line 22: HR=Heart rate=pulse=beats/min; RR=respiratory rate=# of breaths/min.

Line 23: Hct=hematocrit=% of red blood cell in a given volume, written as Hct=36%.

Line 29: List any comments you feel appropriate. The more information the better! Annotate any potential problems in this space.

Line 30: [ISS/TISS], disregard

Line 31: Place Y/N in each block when a photo of the wound was taken. Attempt to photograph as many wounds as possible. Insure SSN and a ruler are present next to the wound in each photo.

Key: In the injury classification the following definitions are used. Delayed=needs surgery at some later time to debride wounds. Immediate=needs surgery in a few hours to save life or limb. Urgent=needs surgical intervention now to save life or limb. Expectant= those so severely wounded that they will not survive.

Under type of treatment list all that apply. Chest tube=tube in chest to drain fluid/aid in breathing. Debridement=incision and drainage of GSW. An external fixator=pins in a leg or arm connected to a rod to stabilize a fracture. Nursing care=some patients will be transferred to another facility for nursing care only. Surgery=indicate the type of surgical procedure performed; use as many as necessary.

ANNEX C

Suggested items for Saudi Arabia. Military Items are a must. Order items suggested to make your stay more comfortable.
List was prepared Feb 14, 1991.

Suggested Item	Quantity	Military
ALCOHOL	NONE	
BAG, AWOL	1	
BAG, BARRACKS	1	X
BAG, DUFFLE	1	X
BAGS, TRASH LARGE	4	
BAGS, ZIPLOC	1 bx	
BALM, LIP	2	
BATTERIES	1 dz	
BDUs, SUMMER WEIGHT	2	X
BDUs, TEMPERATE WEIGHT	2	X
BELT, WEB WITH OPEN FACE BLACK BUCKLE	1	X
BOOK, MEMO	4-6	
BOOTIES, POLYGUARD	1 pr	
BOOTS (Jungle if you have them)	2	X
BOTTLE, URINE COLLECTION	1	
BUCKETS, PLASTIC SMALL	1	
CAMERA AND FILM	1	
CAP, BDU	2	X
CAP, COLD WEATHER	1	
CAP, WATCH TYPE	1	
CARD, GENEVA CONVENTION	1	X
CARD, MILITARY ID	1	X
CARDS, PLAYING	1	
CASH: MONEY, CHECKBOOK, CREDIT CARDS		
CLIPPERS, NAIL	1	
CLOTHESPINS	6+	
CORD, PARACHUTE OR CURTAIN CORD	50 ft	
CUP, THERMAL	1	
CURTAINS, SHOWER	1	
DETERGENT, LAUNDRY (plastic containers)	1 ct	
DRAWERS, COTTON BROWN	7	X
FLASHLIGHT, MILITARY TYPE	1	
GLASSES, MILITARY	2 pr	X
GLOVES, BLACK LEATHER WITH INSERTS	1	X
HAMMOCK, SMALL NYLON	1	
HANDKERCHIEF	7	
INSERTS, PROTECTIVE MASK	1	X
INSIGNIA, RANK SUBDUED	5 ea	X
JACKET, FIELD	1	X
KERCHIEF, NECK	1-2	
KIT, SEWING	1	
KIT, SHOE (polish and brush)	1	X
KLEENEX	1-2 bx	
KNIFE, POCKET	1	
LINER, FIELD JACKET	1	X
LOTION, SKIN MOISTURIZING	2 bt	
MARKERS, WATERPROOF BLACK	2	
MATCHES (preferably waterproof)	1 bx	
MEDICATIONS	6 mo	
MIRROR, CAMPING TYPE (non-breakable)	1	
PADLOCKS AND CABLE	2	
PAPER, WRITING/PEN, PENCILS, ENVELOPES		
PILLOW, SMALL	1	
PLUGS, EAR	1 pr	X
PROFESSIONAL MATERIALS	??	

Suggested Item	Quantity	Military
RADIO WITH HEADPHONES	1	
RAZOR (battery operated or safety)	1	
RAZOR BLADES	1 pkg	
READING MATERIALS (books, magazines, etc.)		
SANITARY NAPKINS (feminine hygiene items)		
SCARF, MILITARY GREEN OR BROWN	1	
SHAMPOO	1 bt	
SHIRTS, CIVILIAN WITH COLLARS (no t-shirts)	1-2	
SHOES, CIVILIAN	1 pr	
SHOES, RUNNING	1 pr	
SHOES, SHOWER	1	
SHORTS	none	
SOAP, BATHING	2-4	
SOAP DISH	1	
SOAP, SHAVING	1	
SOCKS, CIVILIAN	2 pr	
SOCKS, WOOL OLIVE DRAB	7 pr	X
STAKES, TENT	6	
SUNGLASSES	1 pr	
SUNSCREEN	2	
TAGS, ID (dogtags)	1 st	X
TOOTHBRUSH	1	
TOOTHPASTE	2	
TOWEL, BROWN	4	X
TROUSERS, CIVILIAN	2-3	
UNDERSHIRT, COTTON BROWN	7	X
UNDERSHIRTS, POLY PRO	2	
UNDERWEAR, COTTON PANTIES AND BRAS (female)	7	
UNDERWEAR, THERMAL	2 st	X
UNIFORM, PT ARMY (including sweats)	1 st	X
WASHCLOTH, BROWN	2	X
WATCH, DATE TYPE	1	
WET WIPES (individually packaged)	2-3 bx	

Order Number	Equipment	Price	Quantity	Total	Min. Needed*
799-3121	PS/2 MDL P70 386 120mb HD 4 MB RAM 20 MHZ*	5226	2	10452	10452
799-208	PS/2 MDL P70 386 30mb HD 2 MB RAM 16 MHZ*	3777	2	7554	7554
799-3193	Nylon Carrying Case, PS/2 MDL P70	114	4	456	456
899-025	1300MB DAT Backup unit w/MCA card for P70*	3943	1	3943	3943
899-021	DAT cleaning kit	21	1	21	21
899-028	4mm Blank 1.3 GB tapes backup unit	21	5	105	105
799-144	P70 Token-Ring Adapter/A	680	4	2720	2720
799-409	Token Ring Network Adapter Cable	27	4	106	106
799-068	Multist. Access UNIT-Wiring Hub (OM)	699	1	699	699
799-1755	IBM PS/2 300/1200/2400 Internal Modem/A*	342	1	342	342
820-018	Smart-UPS 400 Slim-Line Uninterrup. Pwr SRC*	320	4	1260	1260
820-103	Novell PS/2 Style Interface Kit*	25	1	25	25
975-006	Workstation Install/Node*	60	3	180	180
975-009-3C	Novell Server and Operating System Install*	575	1	575	575
975-004-2	Application Software Installation Per Program*	85	2	170	170
	Subtotal			28,608	28,608

Software

Order Number	Equipment	Price	Quantity	Total	Min. Needed*
	IBM DOS 3.3*	100	4	400	400
653-577-3	Netware ELS II V 2.15 *	1163	1	1163	1163
356-012-0193	WordPerfect V5.1 (Server)*	235	1	235	235
356-012-000	WordPerfect Node license*	140	3	420	420
356-034-20	WordPerfect 5.1 Includes 20Pak for Laptops	3803	1	3803	
016-035-0193	DBaseIV 1.1 Program (Server)*	434	1	434	434
016-039-0193	DBaseIV Lan Pak*	560	1	560	560
016-037-0193	DBase Developers Edition	735	1	735	735
356-014-0192	Draw Perfect V1.1	249	1	249	249
445-018-019	Harvard Graphics	306	1	306	306
306-257	Hayes Smartcom III Modem* Software	133	13	1729	133
	Subtotal			10,034	4,635

Printers

Order Number	Equipment	Price	Quantity	Total	Min. Needed*
866-363-001	HP PaintJet, with RS232C	914	1	914	
866-409	HP Laser Jet IIID/1MB RAM*	2296	1	2296	2296
866-366	HP Post Script Option*	498	1	498	498
866-074	2MB RAM board upgrade*	253	1	253	253
	Printer cable	10	1	10	10
	Subtotal			3,971	3,057

Laptop Computers

Order Number	Equipment	Price	Quantity	Total	Min. Needed*
	TI TravelMate 2000	2500	12	30000	
	Carrying Case	70	12	840	
	2400 Baud Internal Modem	350	12	4200	
	Add-on battery	175	12	2100	
	Subtotal			37,140	
	Computer Expendables			1000	1000
	Cameras	220	12	2640	2640
	Camcorder	1000	2	2000	2000
	Office Supplies			5000	5000
	Printer Costs - 12,000 sheets			2500	2500
	Subtotal			13,140	13,140
	TOTAL			92,893	49,440

Copy _____ of _____ copies

MRDC, CDATeam

Presidio of S.F., CA

26 0900 Feb 91

OPORD2

References: Map Sheets

Time Zone Used Throughout the Order: ZULU

Task Organization: Annex A (Task Organization)

1.   SITUATION

     a.   Enemy Forces. (See Current INTELSUM)

     b.   Friendly Forces.

     7th MEDCOM provides medical support to units as directed in Operation
Desert Storm.

     c.   Attachment and Detachments. None.

     d.   Assumption. Portions of US casualties will be evacuated to major
hospitals in Germany.

2.   MISSION

     The Casualty Data Assessment Team (CDAT) will collect pertinent data related to
the care and medical management of combat casualties. This team will collect data
specifically related to physical (mechanical) trauma but will also collect information on
other types of trauma when they are combined with mechanical trauma. Data will be
critically analyzed searching for ways to alleviate injuries and to provide a more rapid
return to duty for injured soldiers.

3.   EXECUTION

     a.   Concept of Operation. Combat Data Assessment Team will deploy to
Germany to US Army hospitals to evaluate wounded soldiers from Operation Desert
Storm. Command and analysis element will establish a base of operations in Landstuhl.
There will be one research element at the US Army Hospital Landstuhl, one at US Army
Hospital Frankfurt and one at US Army Hospital Nürnberg. Research elements will
collect data using CDAT Form (Annex B). Advance party will depart to arrive in

Germany, on or about 28 February 1991. The advance r̶ ̶.̶.̶/ is as listed and will be assigned as below.

Name	Assignment
MAJ John M. Uhorchak	Landstuhl
MAJ Richard Davis Berry	Frankfurt
CPT James Young	Nürnberg
SGT Steve Hoxie	Landstuhl

The advance party will set up and commence operations at each of their respective hospitals. Deployment of further elements of the CDAT team will be dependent on the situation.

b. Command and analysis element. Command and analysis (C&A) element will establish a base of operations in Landstuhl. The C&A element will input data as received from the research elements. Using an established dBase IV data file, they will analyze those factors which may more expeditiously return soldiers to combat. Once trends are identified, they will be analyzed to see if they are true trends of statistical significance or just isolated variations of injury patterns. C&A elements will be responsible for collecting CDAT Forms. C&A element will be responsible for providing daily summaries. They will also be responsible for publishing the final after action analysis report.

    c.   Research elements 1-3. See Annex A for individual element assignments.

    d.   Coordinating instructions.

    (1)   Upon arrival at their respective hospitals, the advance party will make contact with Plans, Operation, and Training Office in their respective hospital to let them know they have arrived in Germany. They will also pay courtesy calls to the DCA's of each of the hospitals. DCA's names, phone numbers, and Autovons are provided below.

7th MEDCOM, Heidelberg
    COL Bradshaw   DCSOPS
    LTC Fitzgerald   SGS 011-49-6221-17-2555

DCA, Nürnberg
  · COL Bories   011-49-911-653-5996   AV: 461-5996
DCA, Frankfurt
      COL Hawkin   011-49-69-1541-6400/7600   AV: 325-6400/7600
DCA, Landstuhl
      COL Bradford   011-49-6371-86-8105/8106   AV 486-8106

  (2)   Research elements assigned to the various hospitals will by necessity be required to interface with many people in the hospital in an attempt to find out where the various casualties are, what new ones have arrived, and which ones have departed for the United States. This can be accomplished by various methods. Some of the suggested people that may be able to help at each of the hospitals are: PAD, the various nursing supervisors, the chiefs of the respective services and Plans, Operations and Training staff. Remember, we are guests at the hospital and need to do everything possible to get the information without being a burden to that facility.

  (3)   Each research element 1 thru 3 is attached to a major US Army hospital as per Annex C. Each research element will be issued a block of 4000 sequential control numbered cards (1000 cards for the advance party). This control numbering is to maintain accountability and monitor element efficiency. Once the elements have established themselves at the hospital, they will begin filling out the casualty data assessment cards by interviewing as many injured patients as possible to obtain the information on page one. A chart review will be necessary to obtain the information for page two. Special attention will be directed to reviewing the charts of those who subsequently die of wounds (DOW). If all the casualties cannot be surveyed, then it is the research element leader's responsibility to insure that those injured soldiers who are surveyed reflect the spectrum and appropriate percentage of the total casualty load.

  (4)   Handling of the cards. The individual researchers will maintain possession of the cards at all times. During their daily rounds, any new surgical interventions or major changes in patient status will be annotated. Once the patient has been returned to duty or is transferred back in the evacuation chain to another hospital,

the card will be pulled from the active file and forwarded to the C&A element for data entry and subsequent analysis.

(5)   Photos. In as many cases as possible, wounds will be photographed, both pre- and post-operatively. Each photo will have a card showing the patient's Social Security Number and a ruler to provide size relationship and orientation. Exposed rolls of film will be forwarded to the C&A element for storage.

(6)   Data collected will be treated confidentially as any other patient data and as such will not be discussed openly to unauthorized persons. Material may be discussed with the host hospital commander, the medical staff attending the patient, or other members of the research team. Research elements are not to release specific patient information to any other parties.

(7)   The elements are not for use at the discretion of the host hospital commander. Their sole function is to collect casualty data. They will make every effort to collect the data, however, they will not interfere in patient care.

(8)   Individual researchers are asked to document in their log books the following type of information. 1) How long does it take to fill out the card per patient? Try to get a sense of how many you can do in an hour or a day. 2) What are the problems with the card? How can it be improved? How can it be made to flow more smoothly? What things need to be added and/or deleted? 3) Who could fill out this form, i.e., does it need to be a physician, nurse, or MSC? Can some NCO's with medical backgrounds fill out these forms and adequately get the information?

4.   SERVICE SUPPORT

a.   Each team member will deploy with their individual uniforms. The duty uniform in Germany is BDU's. It is recommended that each team member take at least one set of Class B's. As the teams will be lodging on the economy, civilian clothing will be necessary.

b.   Research elements will be on TDY status and responsible for their own rationing, lodging, and transportation.

c.   Initial computer and camera equipment will be carried by MAJ Uhorchak and sub hand receipted to the other team members in Germany.

5.   **COMMAND AND SIGNAL**

a.   Signal. Commercial phone, FAX

b.   Command & Control, LTC Rodkey, CDAT Team Leader will remain at LAIR, San Francisco, CA. Comm: 415-561-5816/17/18. Secure 2641

c.   Advance Party Officer in Charge, MAJ Uhorchak, Landstuhl.

WILLIAM G. RODKEY, DVM
LTC, VC
CDAT Team Leader

Annex A - Task Organization

Command and Analysis Element

Team Leader - LTC William Rodkey, VC

2   *Computer Operator - SGT Steve Hoxie, 01H

   Computer Analysis/Statistician - Ms. Marjorie Hunt, GS-12

   (Others as necessary)

   (Others as necessary)

Research Elements

Landstuhl

   **MAJ John M. Uhorchak, MC

   (Others as necessary)

   (Others as necessary)

   (Others as necessary)

Frankfurt

   *MAJ David Berry

   (Others as necessary)

   (Others as necessary)

   (Others as necessary)

Nürnberg

   *CPT James Young

   (Others as necessary)

   (Others as necessary)

   (Others as necessary)

POC: HQ, MRDC, OPS

   MAJ Dave Williams

*Advance Party, Germany

**OIC Advance Party

DEPARTMENT OF THE ARMY
U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK, FREDERICK, MD 21702-5012

REPLY TO
ATTENTION OF:

SGRD-PLB

MEMORANDUM FOR Colonel D. Tsoulos, U.S. Army Central Command
Surgeon, United States Central Command, MacDill
Air Force Base, FL 33608-7001

SUBJECT: Combat Casualty Data Collection Team

1. Major Carl Mason, MC is acting as my representative on a matter of critical importance, not only to the U.S. Army Medical Research and Development Command, but to the entire Army Medical Department (AMEDD).

2. While it is clearly essential that this Headquarters have combat casualty data, it is of even greater value now and in the future, for the AMEDD to have such data analyzed and categorized from logistical, personnel, and casualty care perspectives.

3. I need your support to place a minimal number of trained trauma epidemiology teams in country ASAP. Please give your strongest consideration to the proposal which will be handcarried by Major Mason who is scheduled to be in your AO o/a 9 Feb 91.

RICHARD T. TRAVIS
Major General, MC
Commanding

SGRD-ULY-MT   13 May 1991

MEMORANDUM THRU: Commander, Letterman Army Institute of Research, Presidio of San
    Francisco, CA 94129-6800

Commander, US Army Medical Research and Development Command, ATTN: SGRD-OP,
    Fort Detrick, Frederick, Maryland 21702-5012

TO: Office of The Surgeon General, DASG-HCD, ATTN; MAJ Deffer, 5109 Leesburg Pike,
    Falls Church, VA 22041-3258

SUBJECT: After Action Report: Operation Desert Shield/Desert Storm

Executive Summary:

        Mission: The purpose of the Casualty Data Assessment Team (CDAT) is to
collect all pertinent data related to the care and medical management of combat
casualties and victims of military trauma. The Casualty Data Assessment Team was
originally envisioned as a 30 soldier-researcher team to be deployed into the Theater of
Operation Desert Storm. Under the command of LTC William G. Rodkey, twelve
sections consisting of one AMEDD professional officer and one senior NCO were to be
deployed at selected forward evacuation hospitals. They were to gather data utilizing the
CDAT form and forward the information to a central analysis unit. The central analysis
unit was to be comprised of senior AMEDD personnel and a computer specialist that
would have the hardware, software and the expertise to perform a critical analysis of the
data. It was envisioned that this information would provide the following benefits: 1)
provide "real time" (no more than 24 hour lag time) information and analysis to MTF
commanders as well as line commanders in the field to give them a better understanding
of the types of injuries and how they were being managed initially; 2) help reduce the
morbidity and mortality from mechanical combat injuries; 3) help establish a more rapid

return to duty of combat casualties, thus helping to conserve the fighting strength; 4) help us devise practical products and strategies for far forward use to better manage combat casualties, either in the present situation or in future scenarios of military conflict; and 5) provide a detailed data base upon which future combat casualty care can be based.

General Description:

Circumstances precluded deployment of the CDAT as was initially envisioned. A European Contingency Team comprised of MAJ John Uhorchak, MAJ David Berry, CPT James Young and SGT Stephen Hoxie was deployed to survey wounded soldiers as they were being evacuated through the three U.S. Army General Hospitals in Germany. From 28 Feb 91 until 14 Mar 91 two hundred four (204) wounded soldiers were interviewed and all available records were reviewed.

Significant Issues:

There are several issues from this endeavor. Some are in regards to the team development and deployment. Others are based on the information obtained from wounded soldiers.

Issue I

Observation: There is a lack of physiologic data on wounded soldiers.

Discussion: This paucity of data can be attributed to two causes: 1) The team was positioned too far to the rear to obtain the detailed information, and 2) The medical records did not arrive in Germany with the patient. Less than 20% of the patients arrived with medical records from Southwest Asia (SWA). The ones that did arrive were so incomplete that there was almost no value either to the next echelon care provider or the research team. Various evacuation hospitals were making their own local forms to fit the situation.

Recommendations:

    a.   A Casualty Data Assessment Team must be formalized now, well before any future conflict. It is necessary to analyze soldiers wounds on a "real time" basis to insure that no new enemy weapons systems are being used or that there are no problems with our medical treatment and evacuation system.

    b.   A streamlined, yet comprehensive set of forms is needed that allows the doctors and nurses to rapidly fill out the data they normally use. These forms could provide good documentation of the excellent care given, provide the necessary information to the next echelon and provide enough information to be a valuable research tool. Forms with check boxes, and especially anatomic diagrams would be helpful to all concerned.

Issue II

Observation/Discussion: The majority of injuries were orthopaedic injuries. Over two-thirds of the injuries sustained by these wounded soldiers interviewed were orthopaedic related soft tissue and hard tissue injuries.

Recommendation: Even as the Army downsizes, biomedical research dollars must continue to be appropriated, especially in the combat casualty care arena.

Issue III

Observation: Combat lifesavers played a significant role in the initial treatment of the combat casualty.

Discussion: Thirteen percent of the wounded soldiers interviewed were initially treated by their combat lifesaver. On several occasions this was the only medical treatment available for approximately 1 hour until the combat medics arrived.

Recommendation: The Combat Lifesaver program must be continued in its present fashion.

Issue IV

Observation: Kevlar® vests and helmets performed as designed. An occasional body hit was recorded next to the edge of the body armor. The possibility of extending the neck and shoulder protection should be considered in the next generation of armor. However, the extra weight and possibility of motion limitation must be considered against the incremental increase in protection.

Discussion: Numerous hits without perforation of the vests and helmets were recorded.

Recommendation: Command emphasis on wearing appropriate protective gear is essential.

Issue V

Observation: While there were numerous plaudits about the overall medical care system, there were numerous complaints about various stages of the medical evacuation system.

Discussion: There were reports of long waits, being misrouted, and overtaxed care givers on some flights. Some dissatisfaction may be attributable to victim impatience, but there were enough negative comments to warrant looking at the issue.

Recommendation: An evaluation of medical evacuation policy, methods and equipment is necessary.

WILLIAM G. RODKEY, DVM
LTC, VC
Chief, Division of Military Trauma Research
Leader, Casualty Data Assessment Team

MEMORANDUM THRU: Commander, USABRDL

FOR: Commander, USA Medical Research and Development Command

SUBJECT: Casualty Data Assessment Team After-Action Report

A.   BACKGROUND/PREPARATION

1.   Final go-ahead to prepare for deployment to Europe was received on 25 February, 1991. Following that, final preparations were taken care of locally, to include the procurement of an international driver's license, immunizations, travel orders, and advanced pay.

2.   Team members deployed on 27 February, with arrival in Frankfurt on 28 February at about 0800 hrs., local time. After arrival at the airport, CPT Young was notified by the PO&T office at the 97th General Hospital that no arrangements had been made for the team members to stay locally. After contacting the military hotel in Frankfurt and being told that there were no rooms available, the team members decided to stay that night at the Sheraton Hotel at the airport. During that evening the team members met to discuss the plan for gathering data and pick up supplies, including forms, computers, cameras, and film. On the morning of 1 March the team members each left for their respective assignments.

3.   On 1 March I reported to the 97th General Hospital, with my first stop being the PO&T Office. I was assisted there by CPT Malone. During the course of the day I made contact with and briefed the Chiefs of PO&T, PAD, Personnel, and the Department of Nursing on my mission and projected schedule. COL Golightly-Jenkins, the Chief Nurse, appointed LTC Evans as a contact for me and asked her to help me get settled over the weekend. During the weekend of 2-3 March I was able to get a room at the military hotel and get settled in, as well as have time to familiarize myself with the basic layout of the hospital.

4.   On Monday, 4 March, I was given access to an area from which to work. It was occupied by the air evacuation triage team and was adjacent to the Emergency Room. There was a telephone available but it only rang in the ER, which made

receiving calls problematic at times. At PAD I was given access to the records and computer printouts which were essential to identifying the patients to be interviewed.

B. METHODOLOGY

1. The original plan was to gather comprehensive medical data from the patients' charts as well as to interview them for specific information. My initial approach was to review the charts, first verifying the admitting diagnosis listed on the PAD printout, and then interview the patient. However, it quickly became evident that there were problems with that approach.

a. The first problem was that documentation was a weak point. The documentation coming from the theater was usually sketchy, at best. I found that I could not identify all of the medical units involved in a patient's care, nor could I usually tell exactly what therapies had been administered. Typically, what was available was an assortment of doctors' orders and nurses' notes, with no unit identification. Although there were exceptions, the general level of documentation was poor. Therefore, the information available from the patient record was usually not adequate to complete the CDAT form.

b. Another problem which quickly became evident was the fact that patients were difficult to locate. Many of them had a number of appointments scheduled. The less-seriously injured among them were anxious to get out of the hospital if possible. A number of patients were basically AWOL, sometimes coming back from pass just in time to catch their flight out. Consequently, between appointments and day-passes, locating the patients became difficult at times. To compound the problem, the ward nursing staff was so busy with the large number of patients and the constant patient flow that often they did not know where the patients were. Many of the patients were only at the 97th for 2 days before they were further evacuated. Consequently, in the first few days, I found myself spending a great deal of time going through patient charts and gathering what data I could, only to have some of the patients evacuated out before I could interview them.

2. When the team members compared notes telephonically, it was discovered that we were all having the same problems. Consequently, MAJ Uhorchak revised the data collection plan, eliminating much of the original form. It was decided that we would try to maximize the information gained from the interview. In addition, I altered

my approach to ensure that I didn't get tied up gathering information on "ghosts" who weren't around for interviews.

3.   We had considered the fact that, with fewer casualties than expected, we would probably need to broaden our sample beyond actual combat casualties. However, with patients coming and going so quickly, there were actually more casualties than what I personally had time to interview. Since there were no hospital personnel available to assist me, I tried to limit my sample to casualties as much as possible. However, since triage and PAD diagnostic information was sometimes unreliable, some non-battle injuries were included.

C.   DATA COLLECTED

1.   During the period that I was at the 97th General Hospital, I gathered data on 30 patients. One patient had been interviewed by CPT Young at the 98th General, so I added an update note, rather than duplicate data already gathered. Of those patients, the following trends can be noted.

a.   DEMOGRAPHICS - The majority of the patients (24) were Army, USAR, or NG. The remainder (5) were Marines. They were predominantly male (27 to 2 female) and Caucasian (23). The MOS' covered a spectrum, but a large number were combat arms personnel. There were also 4 77Ws and 2 76Ys who were injured in the Scud Missile attack on 25 February.

b.   INJURIES - The great majority of the patients were wounded by fragments. Only 2 of the casualties suffered gunshot wounds and one of those was accidentally self-inflicted. The largest single group was those wounded in the Scud attack. Also significant was the number injured by grenades and cluster bomblets.

D.   CLOSURE/RETURN

1.   Prior to leaving the 97th General Hospital, I gave a short outbriefing to key personnel and collected supporting data from PAD.

2.   Team members met at the Sheraton Hotel on 13 March for a debriefing regarding overall observations and experiences.

3.   On 14 March the CDAT members returned to CONUS.

4.   Following the return, I transcribed my notes from the patient interviews, prior to forwarding the raw data to MAJ Uhorchak at LAIR.

E. OBSERVATIONS

1. Although evaluating the documentation was a problem, there was no doubt that the patients received excellent medical care. Most of them were openly complimentary about the quality of care. Very few complaints were registered regarding the care they received.

2. Combat Lifesavers seemed to have played an important role in casualty care. Four of the patients specifically mentioned having been treated in the field by Combat Lifesavers. All of them were complimentary.

3. The Kevlar helmets and protective vests did reduce the number of wounds received.

4. The evacuation chain worked well, but the frequent moves and short stays made it difficult for health care professionals to focus on the whole patient. Several of the patients whom I interviewed were having significant psychological turmoil related to their experiences - especially those injured in the Scud Missile attack. However, although their wounds were being well taken care of, they had not received any counseling or help in working through their feelings. In most cases, the staff were not aware that the patients were having emotional difficulties. This is not intended as a criticism of the staff, who were doing an excellent job under difficult circumstances. Rather, it is meant to point out the fact that additional psych resources may be needed at some point earlier in the chain.

F. RECOMMENDATIONS

1. I feel that in order for this type of study to provide maximum benefit, the plan should be restructured from that which was originally submitted. Although it would possibly involve more personnel, having team members situated both in theater and in the evacuation chain out of theater would give better data about the way the chain functioned. Initial data could be gathered in theater with photographs of wounds taken. In some cases, it would probably be possible to photograph helmets and kevlar vests which had been hit by fragments. I also think that there should be a provision for gathering data on KIAs, since some of that information could also be crucial. Investigators beyond the theater of operations could update the medical data as the patients go through their facilities.

2. Providing enough personnel to gather the data efficiently is crucial. At all three facilities we were overwhelmed with the number of patients pouring through.

Being a lone investigator in a large, spread-out facility led to a great deal of wasted time.

3.   Obviously, the Casualty Data Assessment Form needs to be revised, based on the problems that we had in using it. Since wound information was difficult to code, a narrative section combined with a front/back anatomical diagram might be incorporated to help simplify the process.

4.   Desert Shield/Storm patient print-outs were obtained from all three European facilities visited. If further information is desired for this study, questionnaires could be sent to the patients through their respective units.

DAVID G. BERRY
MAJ, AN
PRINCIPAL INVESTIGATOR
COMBAT CASUALTY CARE BRANCH

MEMORANDUM FOR: Commander, Letterman Army Institute of Research, ATTN: MAJ Uhorchak

SUBJECT: After-Action Report (AAR) for Casualty Data Assessment Team (CDAT) Assigned to the 98th General Hospital, Nurnburg, Germany

1. The following AAR will provide a detailed summary of the casualty data collection process that took place during the period 27 February through 14 March 1991 at the U.S. Army's 98th General Hospital located in Nurnburg, Germany. The format for this AAR will be as follows: (1) Pre-deployment Phase; (2) Deployment Phase; (3) Mission Execution Phase; (4) Redeployment Phase; (5) Findings/ Observations; and (6) Recommendations. This AAR will also include three enclosures: (1) Data Collection Card; (2) Significant DNBI Data; and (3) Casualty Statistical Data

2. Predeployment.

A. I (CPT James T. Young) volunteered to serve as a member of a 30-man CDAT member in January 1991. The long-term goal was to deploy as a team member to Saudi Arabia in Support of Operation Desert Storm. On or about 21 February 1991, a verbal warning order was issued to prepare to deploy to Nurnburg, Germany to serve as the casualty data collection officer at the 98th Gen Hosp. The secondary mission was to serve as the advance party for follow-on team members in the event that large numbers of casualties arrived at the 98th Gen Hosp. Permission to deploy the CDAT team in Germany was granted by the 7th Medical Command and the Commander, U.S. Army Medical Research and Development Command, and on 25 Feb 91, travel orders were received assigning me to the 98th Gen Hosp for 30 days with a departure date of 27 Feb 91.

B. A point of contact was immediately established in the Emergency Operations Center (EOC) at the 98th Gen Hospital to ensure the hospital staff was aware of the CDAT mission. Travel and rental car arrangements were made through the Fort Detrick

military travel and SATO offices. SATO ensured that the CDAT members would deploy to Germany on the same flight out of JFK International Airport, New York, New York. The travel orders allowed for excess baggage, rental cars, and business phone calls. The per diem rate for Nurnburg was $160.00. On 26 February, I collected advance pay and plane tickets (one-way due to war restrictions).

C. In addition to the DA 1610 travel orders, NATO travel orders were required. A copy of a security clearance was also obtained in the event I attended any meetings in which a security clearance was required. An International Driver's License is required in order to rent a vehicle in Germany. Therefore, the post photographer provided the necessary photographs and the local Frederick AAA office issued the license on 25 February for a fee of $10.00 (reimbursable upon completion of TDY).

2. Deployment.

A. I met CDAT team member MAJ David Berry, AN, at Baltimore/Washington International Airport and we flew to JFK International Airport. At JFK we met with MAJ Uhorchak and SGT Hoxie who had arrived from San Francisco, CA earlier that day. At the PAN AM terminal the team introduced each other and made tentative plans upon arrival in Frankfort, Germany. The team arrived in Frankfort at 0730hrs on 28 Feb 91. After retrieving luggage, a phone call was made to the 97th Gen Hosp Operations section to inform them of the CDAT's arrival to Germany and to inquire about the availability of military quarters. There were no military quarters available, therefore, arrangements were made to stay in civilian housing. The Frankfort Sheraton was very convenient for the CDAT team. Its proximity to the airport allowed the team to quickly get settled and prepare for travel the next day. That evening the four CDAT team members met to discuss the details of the mission and to sign for equipment (cameras and lap top computers).

B. On 1 March the teams deployed to their assigned hospitals. At 1030 hrs I departed on a flight to Nurnburg, Germany and arrived at 1130 hrs at the Nurnburg airport. A call was made to the 98th General Hospital EOC and inform them of my arrival. After receiving directions to the hospital from the NCOIC (SFC Haynes), I rented a car and proceeded to the 98th Gen Hosp. Upon arrival at the hospital, I met

with the EOC staff and received some assistance with reserving a hotel room for the next 30 days. On the afternoon of 1 Mar 91 a courtesy call was made with the Deputy Commander, COL Bories. After presenting an informal 15 minute briefing to COL Bories, he dismissed me for the weekend and asked that I report to his office on Monday morning (4 March) to present the remainder of the data collection research protocol.

3. Mission Execution.

A. On 4 March I arrived at the 98th Gen Hosp at 0830hrs and established an office area in the EOC. I reported to COL Bories' office at 0930hrs for the formal presentation of the CDAT mission. Upon completion of the briefing, COL Bories stated that he would present the research protocol to his commander and staff for approval/disapproval. He recommended that in the meantime I consult with the Patient Administration section to get information on the 350+ DNBI patients the 98th Gen Hosp had received prior to the initiation of the ground war. It was at this time that I received word that the hospital had received its first group of WIAs from Southwestern Asia (SWA). While waiting for approval to conduct the research, I met with the Assistant PAD officer to get a detailed summary of the number and types of DNBI admitted to the 98th Gen Hosp. At 1600hrs that day I met with COL Bories and was notified that no decision had been made concerning the research project.

B. On 5 March, at approximately 1130hrs, I received permission to interview patients. Before interviewing patients, I met with the Chief Nurse and explained the research protocol. I was then taken to the four patient wards and introduced to each head nurse. After meeting with the ward nurses, I phoned MAJ Uhorchak to inform him of my status. During that phone conversation, MAJ Uhorchak informed me that after conducting a number of interviews, there were very few complete medical histories arriving with the SWA patients. Incomplete medical histories wasted valuable time researching records that returned little information. Thus, due to the lack of manpower, the second half of the data card was not to be completed. I was instructed to (in order to save time) interview the patients most likely to have been WIA and rely solely upon their memory recall of the events that led up to their injury, as well as the medical treatment/evacuation process that took place after the injury was sustained. At 1330hrs on 5 March the patient interview process was initiated. An average of two interviews

were completed per hour. By COB on 5 Mar, 8 casualty data cards had been completed and the hospital had received approximately 20-25 WIAs & 20-25 DNBIs with an additional 50 patients of the same proportion expected within the next 24 hours.

C. Every morning that week I started and finished the day with the following routine: (1) Check with PAD on any new admits/releases; (2) stop at the EOC and phone MAJ Uhorchak to discuss status; (3) Provide MAJ Connors (Nurse POC) daily briefing; (4) conduct patient interviews; (5) check-in at the EOC for phone messages throughout the day; and (6) at the end of the day, check with the patient evacuation section to get information on incoming patients and outgoing evacuation flights.

D. By 8 March, the 98th Gen Hosp had received 100+ patients from SWA with the possibility of additional patients arriving over the weekend. By 8 March approximately 45-50 data cards had been completed. By 11 March, SWA admissions to the hospital had ceased with no additional patients expected. On the morning of 11 March a warning order was issued by MAJ Uhorchak to prepare to redeploy from Frankfort back to the United States NLT 14 March. The local SATO office handled all travel arrangements; rail and plane tickets would be available by the afternoon of 12 March. Sixty-two interviews were completed by COB 12 March. Outbriefs were provided to MAJ Connors (Nurse POC), COL Knepper (Chief Nurse) and COL Bories (Deputy Commander).

4. Redeployment.

A. On 13 March I stopped by the EOC to thank MAJ Williams and his staff for their support and visited the wards and had photographs taken with the soldiers who had yet to be evacuated to the United States.

B. After the rental car and hotel administrative requirements were completed, I caught the 12:19 PM train from Nurnburg to the Frankfort Airport with a final destination to the Frankfort Sheraton. The CDAT team discussed our respective experiences and presented relevant issues concerning the casualty data collection process. The team agreed to retain the data cards with the intent of sending them to MAJ Uhorchak once after-action reports and the transcribing of personal notes from each data

card was completed. The following morning MAJ Uhorchak and SGT Hoxie departed for San Francisco, and MAJ Berry and I departed for Dulles International Airport.

5. Observations/Findings.

   A. Deployment/Redeployment.

      (1) Travelling as a team to and from Frankfort, Germany was a very effective means in which to conduct informal mission briefs and after-action reviews. The Frankfort Sheraton served as an excellent transition point for the CDAT team. Its location saved the team time and took a lot of stress out of travelling. The hotel was conveniently located next to the airport and had access to the railway system which significantly impacted upon my redeployment from Nurnburg to Frankfort.

      (2) CDAT meeting prior to beginning data collection was essential. Helped to clarify the mission and the goals/objectives of the research project. As patients asked questions about the research, I had the correct information to give them.

   B. Hospital Support.

      (1) Permission to conduct the research at the hospital should have been approved prior to my arrival at the hospital. I lost valuable time waiting for a decision.
      (2) 98th Gen Hosp EOC worked very well as an office location. I had direct access to all hospital operations, as well as secure phone capability and a reliable staff to take messages 24 hours/day, 7days/week.
      (3) PAD office was very helpful in providing information regarding incoming/outgoing patient status' and identifying where the highest concentrations of WIAs were located in the hospital. Also provided a detailed report of all DNBI patients received.
      (4) Nursing staff was very helpful as it provided a liaison that introduced me to each head nurse. Each ward knew of my presence and allowed me full access to their patients.

B. Data Collection Form.

       (1) The data collection form could not accurately describe the wounds received by the patient. The form was very ambiguous; it did not have the capability to document exact wound location, size, depth and the number of wounds received by any one part of the body.

       (2) The data collection form does not have the ability to describe the actions which led up to the injury (i.e. "I was in the prone position and an explosion on my left sent shrapnel towards my position.").

       (3) Once the second page of the form was eliminated, the patient was given free reign to express his/her thoughts and feelings. This free expression of thought provided more detailed information than what was allowed for on the form (i.e. "this unit was great" or "the bullet entered here and it felt like a hot coal.").

       (4) WIA/DNBI is very difficult to determine from the patient - data collector interview.

C. Data Collection Process.

       (1) In order to gather the information and pictures for each patient, IAW the original objective, it would have taken a minimum of 1 man-hour per patient.

       (2) Pictures of wounds could best be taken in the combat zone where wounds were left undressed. Once patients arrived in the fixed facility closed dressings were applied.

       (3) One data collector was inadequate for the number of casualties that were admitted to the 98th Gen Hosp.

       (4) Talking to the CDAT team leader (MAJ Uhorchak) on a daily basis ensured that any changes in the mission were quickly communicated. When changes in the data card and collection process were required, our conversation prevented me from wasting time using the old format and thus ensurir~ a standard data collection process was in use.

       (5) Soldiers were very willing to provide any information asked of them. It was important to establish common ground during the initial phase of an interview (i.e. informing them of my infantry background or asking them questions about their MOS). The format of the first page of the data card was very effective in allowing the

soldier to gradually "warm" and grow more comfortable with speaking to the interviewer.

(6) Due to the lack of data collection personnel, time was the limiting factor in collecting information. If time had been spent to conduct interviews and check patient records output would have been cut in half, and thus, a lot of information would not have been documented.

(7) The open-ended interview relied heavily on patient recall. Unfortunately, a number of patients could not remember the exact evac sequence and treatment provided; however, with some assistance from the interviewer, they could recall approximate days spent at each MTF.

(8) Having the patient draw pictures of the battlefield/vehicle and their exact location when the injury occurred helped to gain a clear focus on the circumstances and actions that took place on the battlefield. The drawings allowed better questions to be asked of the patient.

(9) Follow-up visits were made to a number of patients. These visits mostly entailed light conversation; however, in some instances, new casualty data was provided. The visits also provided a morale boost for the patient, as there were not too many people on the hospital staff who had time to sit down and "talk about the weather."

(10) The best time to interview patients was during their breakfast, lunch or evening meal. The patients were most likely to be found in their rooms at these particular times.

(11) Prioritization of patients who were WIA ensured that just those suspected of having been WIA or wounded by a ballistic missile (bullet, fragment, etc.) were interviewed (tried to avoid DNBI patients; however, a number of the diagnoses received were mistaken).

D. Other Observations.

(1) CLSs were, in most instances, the first to provide medical care on the battlefield. Provided BTLS treatment for number of casualties.

(2) Medics were often on site within 10-15 minutes.

(3) Patients claimed that medical treatment provided by CLSs and 91As was excellent. CTT skills were often used during self and buddy-aid by non medically trained soldiers.

(4) MEDEVAC system was highly praised by most casualties. Only in fast moving armor units and other scout units did the evacuation process appear to be slow.

(5) Every USAR and National Guard medical unit received laudatory comments from every soldier I interviewed. U.S. Army medical personnel as a whole were highly praised.

(6) There were some problems noted in the ground evacuation system between the evac hospitals and the air staging facility at KKMC. Drivers of ground FLAs "knew only one speed (fast)," when transferring patients from hospital to hospital. Poorly equipped buses were used to transfer litter patients (broken bones, amputees, etc.) over rough terrain. Casualties had emotional memories of these transfers; ("never ending," "had to encourage others on the bus to hold on").

(7) Major problems noted at the USAF Air Staging Facility at KKMC. Received numerous complaints regarding the care provided to patients. Patients claimed the ASF staff displayed an indifferent attitude towards them and were insensitive to their needs.

(8) Received mixed reviews concerning the flights to Rein Mein Airfield from KKMC. Some patients indicated that the amount of attention provided was adequate, while numerous others indicated that the flight nurses and flight medics seemed to ignore them and concentrate on their personal problems. One patient actually overheard flight nurses complaining about casualty requests for assistance. Patients noticed considerable difference in the poor quality of health care and the low level of concern provided by USAF personnel.

(9) Flack vests and Nomex protective suits prevented many serious injuries.

(10) A number of U.S. casualties indicated that the battlefield was littered with unexploded ordnance. A number of casualties also thought their injuries were caused by U.S. cluster bomblets.

(11) The number of ballistic injuries were well dispersed among the various MOSs.

(12) Soldiers indicated that I was the first individual to speak to them about their experiences, probably the first person in an authority position to have the time to listen to their individual stories and concerns.

(13) I indirectly served as a patient advocate. I relayed the patients' concerns regarding their short and long-term futures to the nursing staff, who, in-turn, relayed these messages to the Command Group at the 98th Gen Hosp for further action.

6. Recommendations (Data Collection Process).

A. In the event data collection teams are not allowed in theater, teams of 4-8 personnel should be deployed to each fixed facility where casualties are expected to be admitted.

B. If the data collection teams were allowed in the Theater, they would probably best deployed at the last point in the evacuation chain (i.e. the EVAC Hospital before the ASF): (1) Patients less likely to be under heavy sedation; (2) complete picture of the evacuation process; (3) wounds remain undressed; (4) probably have more time to interview the patient (if required). Patients were evacuated very quickly until they arrived at the Evac hospital prior to being transferred to the ASF. A minimum of 4-8 member teams would have to be deployed to these locations in order to quickly gather data on every patient. Average time spent in the Theater was only 6-8 days. Given a sizable data collection team in the Theater, a two-person team located at each fixed facility could pick up any "strays" that may have been evacuated in the Army system without being interviewed. Also, U.S. Air Force, Marine, and Navy soldiers do not flow through the Army's medical evacuation system; therefore, teams positioned in designated fixed facilities would serve as a catch-all for patients from all of the armed services.

C. In order to gather data quickly, the form should be amended in such a way that allows the soldier's story to be transcribed easily. Having a set of pre-determined questions concerning the "Who shot John" portion of the interview would increase the speed of data collection and ensure that each data collector obtained the same information. This system would provide a consistent data pool to the researcher.

D. Prior to initiating the interviews, data collectors should also have drawings of vehicles used on the battlefield. The data collector would have a separate sheet for each vehicle (i.e. Bradley, M-113, etc.). The drawing would contain front, rear, side and top views of the vehicle with labels identifying key crew positions within the vehicle.

E. During the build-up phase of a potential war, a data collection system should be set up to ensure that valuable DNBI information can be obtained either at field or fixed level hospital facilities. This system would identify DNBI trends early in the pre-war stages as well as during the conflict. The 98th Gen Hosp was designated specifically for patient overflow, and admitted well over 300 DNBI patients.

F. The statistic Ballistic/Non-Ballistic Wound should be included on the form to quickly identify NBI casualties injured by friendly fire before and after the conflict begins and ends.

G. Prior to deployment, a short block of instruction should be provided to data collectors. The class would discuss the mission of the team and ensure each collector knew the who, what, where, why and how of the data collection process. The class should discuss interview techniques (introductions, interview transitions and potentially sensitive subject areas). The interview phase of the class might involve a hands-on exercise. A final area of emphasis of the class would focus on MOS and vehicle familiarization (easier to build a rapport with the casualty if the interviewer has some understanding of how the patient lives on a day-to-day basis in a combat environment). The ultimate objective of the class would be to deploy a quality interviewer who is well-prepared for the mission and will provide quality data to the researcher.

SIGNIFICANT DNBI

(TOTAL DNBI ADMISSIONS AS OF 13 MAR = 367)

1. ORTHOPEDIC (SPRAINS, STRAINS, FRACTURES).
   - A. 93 - LEG (I.E. KNEE, THIGH, ETC.)
   - B. 45 - HAND/ ARM/ FINGERS
   - C. 44 - FOOT/ ANKLE
   - D. 29 - SHOULDER
   - E. 28 - BACK
   - F. 10 - ACCIDENTAL GSW (PRE-GROUND WAR)
   - G. 10 - HIP

2. PSYCHOLOGICAL - 19 PATIENTS (9 VARIOUS DIAGNOSES)

3. MEDICAL   - 99 PATIENTS (NUMEROUS DIAGNOSES)
   - A. 20 - URI/ GI
   - B. 08 - UROLOGICAL
   - C. 08 - HERNIA
   - D. 05 - DIABETES
   - E. 05 - APPENDECTOMY

98th General Hospital
Preliminary Data Analysis

Total Interviewed = 62

Army	54
Navy	01
Marines	07
Male	60
Female	02
Caucasian	40
Black	15
Hispanic	07

98th General Hospital
Preliminary Data Analysis
Injuries by MOS

11B/0311 (Infantry)	8
11M (Mech. Inf.)	8
12 Series (Engr.)	6
63 Series (Mechanics)	8
19K (Bradley)	4
19D (M1A1)	5
31 Series (Commo)	5
91A/6432 (Medics)	4
Others	14
Total	62

98th General Hospital
Preliminary Data Analysis
Injuries

Ballistic		Non-Ballistic	
GSW	12	Trauma	13
Mine/Cluster		Non-Trauma	3
Bomb	18		
Artillery	4		
Anti-Armor	6		
Grenade/			
Detonator	6		

SGRD-ULY-MT   13 May 1991

MEMORANDUM TO: CDAT Team Leader, Chief, Division of Military Trauma
Research, Letterman Army Institute of Research, Presidio of San Francisco, CA 94129-
6800

August 1990 Form format was designed for ease in entering and processing data.

September 1990 Created database structures and screen formats using Dbase IV version
1.1 by Ashton Tate. Three databases were created, one to store demographic
information, one to store wound information, and one to store treatment information.

September 1990 Began development of CDAT program. This program would allow
the user to enter the data into the three databases without manually switching from one
? at use or screen format to the next. Additionally, the last name and SSN of the
soldier would be carried over from the demographics to the wound and treatment
records, insuring that all the data in the three databases would be linked accurately.
Flexibility was built into the system to allow for quick changes in the databases, the
format in which they were entered, and the fields which linked them together.

September 1990 Began development of an editing program to access the three
databases and to insure that only records with common last name and SSN could be
edited at one time.

December 1990 Began testing programs and screen formats. They were suitable for
use by the European contingency.

February 1991 Left for Frankfurt, Germany equipped with computers, cameras, etc.

February 1991 CDAT held a meeting in Frankfurt to discuss the mission. Decided to
enter data when we returned from Germany.

March 1991 Arrived in Landstuhl and began to meet with hospital administration and staff to obtain access to the patients. Decided to simplify the forms by writing down the diagnoses and treatment without encoding them. Encoding would be done back in the states. Developed a program to perform simple counting functions in the data. Received a list of patients admitted to the 2nd General Hospital which enabled us to determine the names and SSN of the patients to interview.

March 1991 When we returned to LAIR, the interview forms were divided into three parts, one portion went to Maj Uhorchak to encode wound data, the second went to Maj Ferris to encode treatments, and the third section went to myself and SPC Lindfors to enter demographics. As records were completed in each section, they were passed on to the next section. Finally, all records were encoded and entered with the help of the soldiers in our division.

To facilitate entry for treatment, we divided the records alphabetically into five groups and entered each group into subfiles which were later merged to create the existing treatment database. The demographics and the wounds were entered into one file.

To insure the integrity of the data, the records were counted in each of the databases and the totals compared with the totals found on the forms. Social Security Numbers and last names were also checked for consistency throughout the databases. Accuracy of the SSN was not as important as consistency in the databases. Further, the databases were checked for duplicate records. Two soldiers had been interviewed twice. Data from both interviews were combined to form a more complete record.

We sorted the data on various fields to obtain the statistical information for this report.

Finally, we printed out all the data and included it with the original records so that the computer records can be compared with the raw data. These records are currently stored at LAIR.

Recommendations

FORM USAGE

 1. If forms are to be used, they should be encoded at the time of the interview. Sul᠎ ᠎ent manipulation of the data is time consuming and increases the risk of human error. ᠎ form should be ready for entry after the interview is complete.

 2. Forms should be replaced by notebook computers that can prompt the interviewer for accurate responses. This can increase the integrity of the data and greatly decrease processing time. The data acquired on the notebook computers can be transferred to a master database for processing (see COMPUTER SYSTEMS RECOMMENDATIONS).

TEAM OBJECTIVES

 It is vital for interviewers to understand the objectives of the CDAT team. If team members do not understand which data is important, they may not ask pertinent and complete questions. Using forms that ask specific questions helps tremendously in keeping the interviewer on track (this would be enhanced further by using a notebook computer). Team members should be kept informed concerning key trends or items that require close scrutiny.

FOLLOW-UP INTERVIEWS

 As noted above, two of our soldiers were interviewed at separate times by different team members. The data from these interviews had to be examined closely and a final composite for each of these two soldiers entered into the database. A standardized method should be developed to handle follow-up interviews, perhaps by flagging the records or otherwise advising interviewers that a previous record has been started on this soldier. Interviews then could be tailored to simply add additional information to the existing record rather than to start a new one.

COMPUTER SYSTEMS

 1. Computer systems should be "user friendly".

 2. The software must be versatile if it is to be effective in meeting the changing demands of the CDAT team. It should be up-to- date with current database applications and include all its functions and applications. Currently there are excellent software

packages that have been designed to meet the needs of the medical emergency and care-giver systems.

3. Technology exists which would eliminate the need for forms and data entry personnel and would greatly increase the accuracy and time efficiency of the system. A system would consist of a notebook or hand-held computer into which the interviewer would enter data while speaking with the patient. This computer could be programmed to prompt the team member to ask specific questions, to tailor the questions in special circumstances, or to avoid questions that are not pertinent to the specific patient. The system could be menu driven where possible, and could employ a touch-screen interface for ease of operation.

Stephen Hoxie
SGT, USA
Division of Military Trauma Research

SGRD-ULY-MT   17 April 1991

MEMORANDUM FOR: Commander, Medical Research and Development
                Command, SGRD-OPS, ATTN: MAJ David Williams,
                Fort Detrick, Frederick, MD 21701-5012

SUBJECT: Questions for Department of the Army Casualty Branch

1.   The Casualty Data Assessment Team (CDAT) needs answers to the
following questions in order to complete our final report on assessment of
casualties from Operation Desert Storm. The Department of Army Casualty
Branch has all of the necessary information, however, they have advised us that
the request for this information must originate from MRDC Headquarters.

2.   Request that your office seek the following information from the DA
Casualty Branch.

    a.   What is the total number of Wounded in Action (WIA)? Does this
number include the SCUD attack victims?

    b.   What is the number of wounded in the SCUD attack?

    c.   What are the inclusive dates to be considered WIA?

    d.   Did all those listed as WIA receive the Purple Heart medal?

    e.   Were the wounds sustained after the suspension of offensive
operation counted as WIA?

    f.   Please compare our list of WIA with your master list and provide a
list of corrections/omissions so we can complete our data files.

    g.   Please provide a complete list of Killed in Action (KIA), cause of
death and copies of autopsy reports if available.

                                    WILLIAM G. RODKEY, DVM
                                    LTC, VC
                                    Chief, Division of Military Trauma Research

ANSWERS: 2 A. TOT WIA = 353 (INCLUDING SCUD)

B. TOT WIA SCUD = 97

C. 1ST WIA OCCURRED 22 JAN 91
   LAST WIA OCCURRED 11 MAR 91

D. NO WAY OF KNOWING - (HOSP CDRS + 2 STARS AUTH TO GIVE P.H.)

E. YES DEPENDING UPON THE TYPE OF WOUND + HOW IT WAS SUSTAINED.

F. WE ARE WORKING W/ DOD PAO TO GET THIS LISTING.

G. WE ARE CHECKING W/ DOVER AFB; (MAY RUN INTO PRIVACY ACT
   PROBLEMS)

DEPARTMENT OF THE ARMY
LANDSTUHL ARMY REGIONAL MEDICAL CENTER
APO NEW YORK 09180-3400

REPLY TO
ATTENTION OF

AEMLA-PAD. (340)   01 March 91

MEMORANDUM FOR All Departments

Subject: Casualty Data Assessment Team

1.   The purpose of this memorandum is to introduce members of the Casualty Data Assessment Team who are here to collect data pertinent to Desert Storm patients. Team members are MAJ (Dr.) John Uhorchak and SGT Stephen Hoxie. Please assist them in any way you can to help them get their mission accomplished. They should be allowed access to patients and any relevant medical documents.

2.   POC for this action is the undersigned at 486-8114/7275.

MICHAEL J. SMITH
LTC, MS
C, Patient Administration Division

Commander
US Army Medical Research
  & Development Command
ATTN: SGRD-RMS/Mrs. Madigan
Fort Detrick, MD 21701-5012

Defense Technical Information Center
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Cameron Station
Alexandria, VA 22304-6145

Office of Under Secretary of Defense
  Research and Engineering
ATTN: R&AT (E&LS), Room 3D129
The Pentagon
Washington, DC 20301-3080

DASG-AAFJML
Army/Air Force Joint Medical Library
Offices of the Surgeons General
5109 Leesburg Pike, Room 670
Falls Church, VA 22041-3258

HQ DA (DASG-ZXA)
WASH DC 20310-2300

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US Army Research Office
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