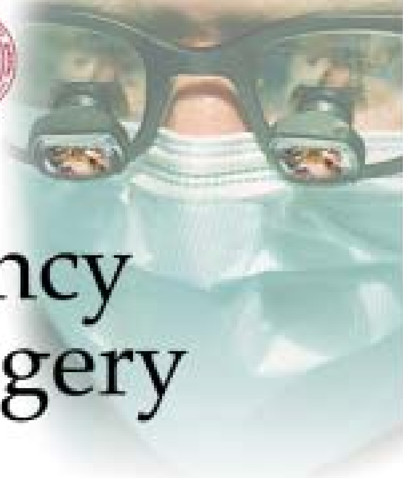
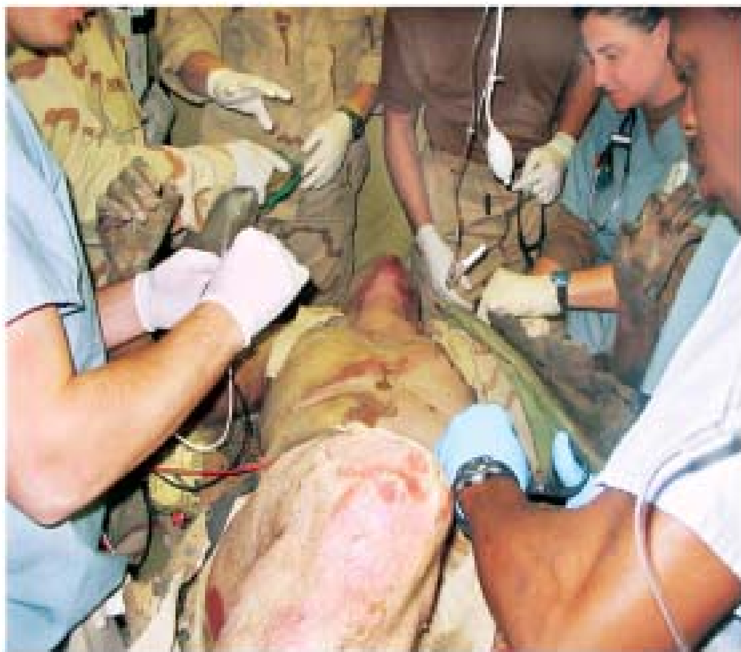


Emergency War Surgery



Emergency War Surgery

Third United States Revision

2004

"All the circumstances of war surgery thus do violence to civilian concepts of traumatic surgery. The equality of organizational and professional management is the first basic difference. The second is the time lag introduced by the military necessity of evacuation. The third is the necessity for constant movement of the wounded man, and the fourth — treatment by a number of different surgeons at different places instead of by a single surgeon in one place — is inherent in the third. These are all undesirable factors, and on the surface they seem to militate against good surgical care. Indeed, when the over-all circumstances of warfare are added to them, they appear to make more ideal surgical treatment impossible. Yet this was not true in the war we have just finished fighting, nor need it ever be true. Short cuts and measures of expediency are frequently necessary in military surgery, but compromises with surgical adequacy are not."

—Michael E. DeBakey, MD
Presented at Massachusetts General Hospital
Boston, October 1946

THE THIRD UNITED STATES REVISION

of

EMERGENCY WAR SURGERY

IS DEDICATED TO THE

COMBAT PHYSICIAN

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Dave Ed. Lounsbury, MD, FACP
Colonel, MC, US Army
Director, Borden Institute

Foreword

It is an honor for me to acknowledge the time, efforts, and experience collected in this third revision of *Emergency War Surgery*. Once again a team of volunteers representing the Military Health System and numerous clinical specialties has committed itself to delimiting state-of-the-art principles and practices of forward trauma surgery.

War surgery, and treatment of combat casualties at far forward locations and frequently under austere conditions, continue to save lives. Military medical personnel provide outstanding health support to those serving in harm's way. As the face of war continues to evolve, so must the practice of medicine, to support those who so selflessly fight the global war on terrorism. Today, American military men and women face a new terrain of mobile urban terrorism and conflict. Despite advances in personal and force protection provided to our forces, they remain vulnerable to blast wounds, burns, and multiple penetrating injuries not usually encountered in the traditional civilian setting. This publication expertly addresses the appropriate medical management of these and other battle and nonbattle injuries.

The editors of this edition are to be congratulated for drawing on the experiences of numerous colleagues recently returned from tours of duty in Southwest Asia in order to provide as current a handbook as possible.

I wish to publicly extend my gratitude, and that of the American people, to the courageous men and women who serve in the medical departments of our Armed Services. I commend your dedicated service and acknowledge your

sacrifices, and those of your families, to provide the best health care attainable to those who protect our nation by their military service. I, and all Americans, are indebted to your service.

William Winkenwerder, Jr., MD
Assistant Secretary of Defense
for Health Affairs

Preface

It is time for another revision of the *Emergency War Surgery* (*EWS*) handbook! In addition to the fundamental advances in the management of victims of trauma since the 1988 edition, the format of the earlier versions was distinctly "user unfriendly."

This edition contains new material that updates the management of war wounds and is filled with over 150 specially drawn illustrations. Equally important is the use of an outline, bulleted format that is so much more concise than the verbosity of the previous editions. Additionally, emphasis in this edition is on the all-important "Emergency" in *Emergency War Surgery*—surgery performed at levels II and III—that constitutes the raison d'être for military surgery. Our intent is that if given a choice of bringing a **single** book on a rapid or prolonged deployment, today's military surgeon would choose this edition over any other trauma book.

The last revision of the *Emergency War Surgery* handbook was published in 1988. Since then, world events have profoundly affected how the US Armed Forces fight and how their medical services provide combat casualty care. The threat of a massive conventional war with the Soviet Union has been replaced by a new enemy: those who espouse global terrorism.

There are ongoing conflicts against terrorists in both Iraq and Afghanistan, under conditions that differ radically from Operations Desert Shield/Storm of 1990–1991. In Iraq there is continuous urban warfare against fanatics who hide amongst the civilian population, while in Afghanistan isolated and sporadic but fierce small unit actions take place in mountainous terrain. Both tactical scenarios are quite different from what occurred in Vietnam and Operation Desert Storm, and in what was expected for a European war against the Soviet Union upon which the 1988 edition was predicated.

Military surgeons must assume a leadership role in combat casualty care especially when faced by such changing conditions of practice. The physicians must know what to expect, and how to configure and prepare the team in an austere and rapidly changing tactical environment with available and necessary equipment. They must know how to take care of an unfamiliar battlefield wound or injury and manage mass casualties. Finally, they must understand the next echelon of care, including any available capabilities, and how to safely evacuate their patient to the higher level. This handbook provides much of the information needed to answer these questions.

One of the most dramatic ways in which military surgery differs from civilian trauma management is the staged provision of care; emergency surgery is carried out at one locale, while definitive and reconstructive surgeries take place at different sites. This traditional aspect of military surgery has found new meaning in the increasing use of damage control surgery for the most critically wounded. Here, the initial operation is designed only to prevent further blood loss and contamination after which resuscitation and completion of surgery takes place, sometimes at larger, more capable medical treatment facilities remote from the battlefield. The US Air Force's fielding of Critical Care Air Transport Teams (CCATT) has revolutionized casualty care by transporting such stabilized patients to higher levels of care during active resuscitation. Efforts to standardize equipment across services are in place, with the use of smaller, lightweight diagnostic and therapeutic devices. Joint interdependence in the treatment and evacuation of the wounded is now the cornerstone of combat casualty care.

As a result of such advances, the Army has been able to restructure field medical facilities essentially making them small and mobile "building blocks."

Despite the changes in the conditions of practice, a military surgeon is far more likely to be deployed today than at any

other time in our nation's history since World War II. In the 1988 version of this handbook, BG Thomas E. Bowen quoted Plato about the likelihood of future conflict: "Only the dead have seen the end of war!" As military surgeons, will we be capable and prepared to render the level of combat casualty care befitting the sons and daughters of America? This revision of the *Emergency War Surgery* handbook provides the information needed to save the country's and military's most precious resource: our soldiers, sailors, airmen, and marines.

Kevin C. Kiley, MD
Lieutenant General, Medical Corps, US Army
The Surgeon General

Prologue

Although called the *Third United States Revision*, this issue of *Emergency War Surgery* represents an entirely new Handbook. Format, intent, and much of the content are new. None of the chapters of the Second Revision has been preserved verbatim. All material has been rewritten by new authors. Flowing prose has been largely replaced by a bulleted manual style in order to optimize the use of this Handbook as a rapid reference. Illustrations are featured much more prominently than in the earlier edition. Lastly, this text is widely available (perhaps even more so than the printed version) electronically on the World Wide Web and as a CD-ROM; a format neither available nor imaginable when the second Revision was released in 1988.

In 2000, the Surgeon General of the US Army called on the Medical Department to revise *Emergency War Surgery*, published in 1988 as the *Second United States Revision* and *Emergency War Surgery NATO Handbook*. Responsibility for this revision was given to the Senior Clinical Consultant in the Directorate of Combat and Doctrine Development. He then collaborated with the Surgeon General's Consultant (General Surgery) to develop a plan. These two called upon consultants from all the Services and established an Editorial Board of volunteers committed to a complete overhaul of the previous Handbook. Through a series of on-line and personal meetings coordinated by the Senior Clinical Consultant, format and content were established. All of the chapters were drafted and underwent review and edit by the assembled Board at Fort Sam Houston, Texas.

Following terrorist attacks of 11 September 2001 on the United States, US military forces were mobilized and deployed to Afghanistan in 2001 and Iraq in 2003. The process in place to complete this now essential Handbook was necessarily disrupted by reassignments and deployments of the very people who had volunteered to produce it. In lieu of

a completed text, Borden Institute hastily published and distributed (on-line and CD) the unedited draft manuscripts then available as *Emergency War Surgery Handbook, 2003 Draft Version*. This issue saw wide use in Southwest Asia in 2003.

In winter 2003 – 2004 Borden Institute took up the task of completing a final version of the Handbook. With numerous surgeons returning from yearlong tours at Combat Support Hospitals and Forward Surgical Teams in Iraq and Afghanistan, the decision was made to seek timely comment on the draft manuscript. Several surgeons with fresh field experience volunteered their subspecialty review. Substantial updates and changes were made to many chapters including: Anesthesia, Shock and Resuscitation, Infections, Damage Control Surgery, Face & Neck Injuries, Extremity Fractures, Abdominal Injuries, Burn Injuries, and Head Injuries.

At the same time material drawn from a Department of Defense Task Force on detainee medical care (July 2004) was adapted for the Care of Enemy Prisoners of War/Internees chapter of this Handbook. The chapter on Triage was expanded to include consideration of combat stress casualties.

The result of this two-stage process is this Handbook. Its intent, and the single-minded determination of the contributors, is the retention of lessons learned from recent, as well as past, battlefield surgery. War surgery in the 21st Century is not a jury-rigged art of accommodation and compromises. Although it can include these, it is a science, grounded on fundamentals of trauma surgery, which recognizes as well the overriding unique principles of harsh and austere environments, mass casualty, blast and penetrating injury, multiple trauma, triage, staged resuscitation, damage control surgery, time, and aeromedical evacuation. The adage that these principles have to be relearned by every generation of military surgeon is probably less true than in the past. *Emergency War Surgery* is a safeguard to assure this.

Mais, plus ça change, plus c'est la meme chose. (The more things change, the more they seem to remain the same.) Remarkable as the enormous changes in surgical diagnostics and therapeutics have been in the 16 years since the last edition of the Handbook, as noteworthy – and humbling – are what have *not* changed. Wound ballistics are the same and often injuries are due to the same projectiles used 35 years ago in Vietnam. The ghastly penetrating wounds, blast trauma, and burns produced by present day conventional and improvised weapons are essentially unchanged from those produced in the last half of the 20th Century. The automatic rifle, rocket-propelled grenade, mortar, and improvised explosive are widely available, easy to obtain, simple to use, ferociously lethal, and not confined to the arsenals of disciplined soldiers. Bearers of these arms today include suicidal fanatics, women, and children.

It is equally discouraging that although losses due to disease have plummeted, salvage rates from severe battlefield trauma sustained in conflict (ongoing as this Handbook goes to press) are similar to previous wars despite improvements in armor, surgery, critical care and evacuation. The died of wounds (% DOW) rate during the American campaign in northwestern Europe of 1944 – 1945 (approximately 3%) was markedly better than that of the American Civil War (14%) nearly a century earlier. But enormous advances in medicine and surgery have not been reflected in substantial improvement in lives saved in forward combat surgical facilities since then (in World War II and Vietnam the rates were 3.5% and 3.4% respectively).

Penetrating wounds of the head and chest are as lethal today as they were in biblical times. Extremity fractures are still best stabilized with external fixators, albeit a newer model. Human blood components, with a short demanding shelf life, have not yet been replaced despite longstanding forecasts of synthetic products. Whole blood continues to be collected and transfused in forward medical units as it was in the Second

World War. Bacteriologic capability to identify wound and cavity contaminants is still unavailable in forward facilities. Meanwhile, antibiotic resistance of numerous pathogens, Gram negative and Gram positive, is a growing problem no longer confined to level IV referral hospitals in the rear.

Though one can hope that major strides in these and other areas of trauma resuscitation will be reflected in a future edition, our more fervent hope is for mankind's dream of peace and the exercise of his better Angels, … whereby this Handbook becomes altogether unnecessary.

Dave Ed. Lounsbury, MD
Colonel, Medical Corps

October, 2004
Washington, DC