EMERGENCY CARE IN THE STREETS

FOURTH EDITION

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Emergency Care in the Streets

To Peter Safar

Preface

In the late autumn of 1974, when Dr. Peter Safar talked me into leaving my relatively calm and secure enclave in the intensive care unit for the world of emergency care outside the hospital, I didn't know I was getting myself mixed up in a revolution. The revolution was in the immediate care of the critically ill and injured, and unwittingly I was being shipped off to the front lines, to marshal a new type of medical shock troops that went by the name of *paramedics*. My job presumably was to teach those troops the sophisticated techniques of advanced life support, but I had a great deal to learn from them as well. The first time I climbed into a sewer to do a resuscitation, I realized there were lots of things they never told me in medical school.

Nonetheless, I was in good hands. My teachers were veteran emergency medical technicians of the Freedom House Ambulance Service and were also very special human beings. They had been recruited by Dr. Safar in 1967 from among the "unemployables" of Pittsburgh's black ghetto and had been among the first ambulance personnel in the country to receive training in advanced life support. They were tough, skilled, compassionate, and professional.

For many months, I rode the ambulances with them. While they learned more emergency medicine, I learned the special stresses and constraints of rendering care outside the controlled conditions of a hospital: CPR in a crowded restaurant, childbirth in the lingerie section of a department store, splinting at the bottom of an elevator shaft, intravenous infusions inside a wrecked automobile. It was an education for all concerned—for the EMTs, for me, and also for the public, who were in those days unaccustomed to the idea that the emergency room had sprouted wheels and definitive care could now begin at the scene.

Out of that experience, the first edition of *Emergency Care in the Streets* was born, together with the first United States Department of Transportation (USDOT) curriculum for paramedics. Now this book is going into its fourth edition, the USDOT curriculum has been completely revised, and the revolution in immediate care of the ill and injured has become commonplace on the streets and byways of the United States and a number of other countries. The paramedic is no longer a strange new creature on the public scene, but rather has become an accepted and respected member of the medical community.

Nonetheless, the revolution isn't over yet. Many things are still changing out on the streets. On the plus side, paramedics are being better trained and are deploying a variety of skills that were not part of the original curriculum. The less cheerful news is that the streets are a little meaner than they used to be, especially as drug abuse has reached epidemic proportions. For those reasons, it became necessary in the 1980s to make major changes in the USDOT paramedic curriculum; thus it also became necessary to make major changes in this textbook.

The current version of *Emergency Care in the Streets*, then, has been entirely rewritten to conform to the most recent USDOT curriculum and to provide coverage of all the topics a paramedic must master for certification. Forty chapters have replaced the original 15, the number of tables and illustrations has been doubled, and a whole variety of new material has been added—on topics including wound ballistics, diving injuries, mountain sickness, violence containment, and paramedic burnout. *Emergency Care in the Streets* is, in short, a much more comprehensive book than it used to be, because paramedics have to learn much more than they used to learn.

There is only one certainty in the field of medicine, and that is that things change. At any time, new research and new data may overthrow some of our most cherished and firmly held concepts. That is another reason why this book—like other books in the medical field—must undergo periodic revision. It is inevitable, therefore, that also during the lifetime of *this* edition, there will be changes in the theory and practice relating to emergency medical care. Even as

I write, there is controversy over the use of antishock trousers, optimal techniques for cardiopulmonary resuscitation, early pharmacotherapy of spinal cord injury, and so forth. For that reason, this text (or any other text, for that matter) should not be regarded as the "last word" on every subject. It is, rather, an attempt to give the paramedic a firm grounding in fundamental concepts—a basis on which to build through a professional lifetime of learning. The treatment recommendations presented here reflect, as much as possible, the current medical concensus. But that concensus may change, and local practice may differ. The paramedic, therefore, should keep abreast of new developments in prehospital emergency care through the professional journals in the field, and should be guided in his or her practice by the policies of the local EMS system.

Looking back now on the days I spent riding ambulances, I realize they were the best days I have known in medicine. They were days of adventure and challenge and the shared pride in having done a tough job well. I learned a lot from the paramedics, and this book belongs to them.

N.L.C.

A Word to Paramedic Instructors

In 1974, I wrote the first version of this book. A lot has changed since then. Paramedics today are a lot more sophisticated, a lot more professional, and have to do a job that has become a lot tougher.

Already by the 1980s it had become clear that the basic body of knowledge to be taught to an EMT-paramedic needed to be expanded; in 1982, the United States Department of Transportation (USDOT) created a support committee to ensure that the changes occurring in prehospital care were reflected in paramedic training curricula. The committee surveyed paramedic training programs in all 50 states and recommended updating the National Standard Training Curriculum for the EMT-paramedic to expand the knowledge base of the paramedic and include topics such as geriatrics, crisis intervention, the biomechanics of injury, and so forth. Accordingly, in 1985 USDOT issued a revised National Standard Training Curriculum reflecting the expanded knowledge objectives defined by the support committee.

The new curriculum clearly required a new textbook, and the fourth edition of *Emergency Care in the Streets* is that new textbook. The book has been entirely rewritten to accord with the revised USDOT curriculum and covers *all* of the objectives of that curriculum. In one or two places, I have introduced material in a sequence somewhat different from that of USDOT, when it seemed to me that the sequence of the current USDOT course was not optimal from a teaching standpoint. But all of the knowledge objectives of the USDOT course are fully covered in this textbook.

There is a great deal of new material in this edition of *Emergency Care in the Streets*, much of it added in response to requests from paramedic instructors. Thus the current edition now has wholly new sections on medical control, burnout and stress management, nasotracheal intubation, the biomechanics of injury, advanced trauma life support, high altitude and diving injuries, intraosseous infusions, dealing with renal dialysis patients, and violence containment, to name but a few. There is, furthermore, considerably expanded discussion of all topics, from medicolegal issues to neonatal care.

The fourth edition of *Emergency Care in the Streets* has also been reformatted to make it a more useful didactic tool. Each chapter now begins with a list of **knowledge objectives** to enable the student to define precisely what is expected of him or her. Each of those knowledge objectives is systematically tested in the brand new *Study Guide for Emergency Care in the Streets, Fourth Edition*, which was written to accompany this edition. Important points are highlighted in **boxed summaries** throughout the text, to permit quick reference during review. Logical processes are summarized in **flowcharts,** to help the student identify key decision points in evaluating and managing various emergencies. New vocabulary is highlighted in boldface type when it is first introduced, and summarized in **glossaries** both at the end of each chapter and at the end of the book. **Skill evaluation checklists** have been provided as an aid to practicing manual skills. At the end of each chapter, there is a list of **further reading** for those instructors or students who wish to pursue any particular subject in greater depth. More than 150 new **illustrations** have been added to this edition of the book, along with more than 80 new **tables,** to help clarify and summarize important concepts.

The information on specific medications has in the current edition been collected in a **Drug Handbook** at the back of the textbook, for easier reference both during and after the course. The Drug Handbook contains detailed information on all of the field medications mentioned by USDOT, along with some others that are in common use in American EMS systems. A second section of the Drug Handbook contains a new **Index to Commonly Prescribed Drugs,** organized alphabetically by trade name, to enable the

paramedic to quickly identify the medications taken by a patient at home and the indications for which those medications are prescribed.

As I mentioned, a great many of the changes and additions made to this book were the result of suggestions from paramedic instructors throughout the United States, who were more than generous in sharing their teaching experiences with me. I hope that, thanks to their help, this fourth edition of *Emergency Care in the Streets* will prove a more effective aid to the very able teachers who are preparing the current generation of paramedics to do the best job possible.

N.L.C.

Acknowledgments

Somewhere I once read something about the loneliness of writers. I suppose that may be true if you're writing the Great American Novel. But people who write medical textbooks aren't lonely. They have lots of help, all along the way, and I should be remiss if I did not mention those whose help has made this textbook possible. So my sincerest thanks to:

Dr. Gerry Baum, who took time from his own formidable textbook of pulmonary medicine to review my chapter on respiratory emergencies, and whose unshakable optimism has carried me through many nonrespiratory emergencies

Ms. Debra Corman, veteran copy editor of all four editions of this book, who has kept me on the grammatical straight and narrow path for more than twelve years

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Dr. Richard Liberthson, who was in the midst of moving to a new office when I issued a desperate plea for some ECG tracings and who managed somehow to find just what I needed among all the packing crates and boxes

Dr. Douglas Lindsey, who responded to my casual query about the current status of military antishock trousers with a scholarly treatise on the subject and managed to cram more good sense into three pages than I had found in hundreds of pages of the medical literature

Dr. Eugene Nagel, who launched one of the first paramedic programs, in Miami, before paramedics even had a name, and who has held my hand by long-distance phone through four editions of this book

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The editorial production team at Little, Brown—including Lou Bruno, Julie Hagen, Priscilla Hurdle, and Sue Michener—who shepherded this book safely through various stages of production in peace and war

The ICU nurses of Winter Haven Hospital in Winter Haven, Florida—particularly Nancy, Dottie, and Mary Jo—who managed to round up the most complete collection of ECG rhythm strips in the shortest time ever recorded

The paramedics of the Boston and Pittsburgh EMS systems, with whom I "rode rescue" for several days before starting the new edition of this book and who set a standard of professionalism that any paramedic could be proud to match

My students, wherever they may be, who never let me get away (for very long) with saying anything too abstruse.

Emergency Care in the Streets

NOTICE. The indications and dosages of all drugs in this book have been recommended in the medical literature and conform to the practices of the general medical community. The medications described do not necessarily have specific approval by the Food and Drug Administration for use in the diseases and dosages for which they are recommended. The package insert for each drug should be consulted for use and dosage as approved by the FDA. Because standards for usage change, it is advisable to keep abreast of revised recommendations, particularly those concerning new drugs.

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THE PREHOSPITAL WORLD

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THE PREHOSPITAL WORLD

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Roles and Responsibilities of the Paramedic

OBJECTIVES

> In real life, paramedics try to comfort little old ladies with broken hips, and they sometimes help derelicts who are dirty and smell bad. Other times, they take abuse from people who are under the influence of drugs or alcohol. Occasionally, they get called to exciting and dangerous emergencies that would make a good TV show, but that doesn't happen every day.
>
> Good paramedics understand that the routine and *un*glamorous parts of their job are important too. Their occupation may not be as exciting or glamorous as the TV version, but what could be more important than having the right and the responsibility to protect and care for the life and health of other people?
>
> Jim Page, Editor-in-Chief of *JEMS**

In this chapter, we shall examine how paramedics came to be, what paramedics do, and what gives paramedics the authority to function. By the end of this chapter, the student should be able to:

1. Describe the attributes desirable in a paramedic
2. List at least five responsibilities of a paramedic
3. List at least five skills performed by paramedics that may not be performed by the emergency medical technician–ambulance (EMT-A)
4. Explain why medical control is necessary for paramedic services
5. Give an example of
   - Prospective medical control
   - Immediate medical control
   - Retrospective medical control
6. Identify the correct definition of
   - Certification
   - Licensure
7. List at least three ways of preventing skills and knowledge from getting "rusty"

*Quoted from *JEMS* 11(8):S–8, 1989.

HOW DID PARAMEDICS COME TO BE?

Thirty years ago, there was no such thing as an emergency medical technician–paramedic (EMT-paramedic, EMT-P). Today, there are more than 50,000 EMT-paramedics in the United States and another several thousand in various other countries, including Australia, Canada, the United Kingdom, and Germany.

The story begins, in fact, in Belfast, Northern Ireland, as well as in Germany and several countries of Eastern Europe, where mobile intensive care units (**MICUs**) were introduced in the 1950s and 1960s to enable early care of the critically ill and injured. The idea was very simple: Bring the emergency room *to* the patient before bringing the patient to the emergency room and thereby save precious minutes that could mean the difference between life and death. It soon became clear that the idea worked, and MICUs—staffed with specialist physicians—began to proliferate in various European countries.

In the United States, however, it proved unfeasible to staff a sufficient number of ambulances around the clock with physicians specially trained in emergency care. To begin with, at that time—in the early 1960s—there *were* no physicians specially trained in