

TWELFTH EDITION

PREHOSPITAL EMERGENCY CARE

Joseph J. Mistovich



Keith J. Karren

MEDICAL EDITOR Howard A. Werman, MD

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Prehospital

Emergency Care

Joseph J. Mistovich, MEd, NRP

Professor Emeritus
Department of Health Professions
Youngstown State University
Youngstown, Ohio

Medical Editor

Howard A. Werman, MD

Professor Emeritus
Department of Emergency Medicine
The Ohio State University
Columbus, Ohio

Legacy Authors

Keith J. Karren, PhD, EMT-B

Professor Emeritus
Department of Health Science
Brigham Young University
Provo, Utah

Brent Q. Hafen, PhD

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Content Management: Kevin Wilson
Content Production: Michael Giacobbe
Product Management: Katrin Beacom

Product Marketing: Mark Marsden
Project Management: Vanitha Puela and Anitha Vijayakumar
Rights and Permissions: Ben Ferrini and Matt Perry

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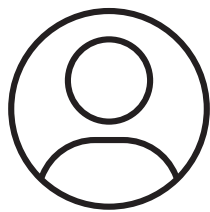
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Dedication

To my best friend and beautiful wife, Andrea, for her unconditional love and inspiration to pursue my dreams. She has always been and continues to be my endless source of support and love. To my daughters Katie, Kristyn, Chelsea, Morgan, and Kara, who are my never-ending sources of love, laughter, and adventure and who remind me why life is so precious. You have all grown to be outstanding adults that are constant contributors to the good of society. I cherish every minute we spend together. To my grandchildren Avery, Jameson, and Robby—you can't ever imagine the overwhelming amount of love and joy you have brought into our lives. I love you all dearly!

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JJM

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Preface

Congratulations on your decision to undertake an EMT education program. The field of emergency medical services is extremely rewarding and will provide you with experiences you will find both challenging and gratifying.

Be Prepared

As an EMT student, you have a few pressing concerns. You want to be prepared:

- To pass your course exams
- To pass the credentialing exam that allows you to practice as an EMT
- To treat patients to the best of your ability
- To do well in all aspects of your job

As the author, I want to assure you that *Prehospital Emergency Care*, 12th Edition, is written to help you achieve those goals.

It All Makes Sense

The key to the above goals—passing your exams, providing excellent patient care, and doing well in your job—is understanding how everything fits together:

- A basic understanding of anatomy, physiology, and pathophysiology will allow you to better understand signs, symptoms, and emergency care.
- An anatomical and body systems approach to the physical exam will link conditions to assessment findings.
- Knowledge of the presentations of common medical conditions and traumatic injuries encountered in the prehospital environment will enable you to perform efficient and accurate assessments.
- A diagnostic-based approach to patient assessment will allow you to form a differential field impression of the condition or injury.
- An assessment-based approach to patient assessment will allow you to identify and provide immediate emergency care for life-threatening conditions or injuries.
- You will learn how to provide the most efficient and effective emergency care.

The good news is that—although what you have to learn may seem daunting in the beginning—it all makes sense. In fact, that is the philosophy behind this textbook. Our purpose has been to show you at every step of your EMT education program how:

It all makes sense!

Features

All of the features in this textbook are designed to help you navigate the anatomy, physiology, pathophysiology, assessment findings, medical conditions, traumatic injuries, and emergency care to best prepare you to provide excellent emergency medical services to the patient—beginning with the dispatch of the call, followed by assessment and management of the patient and delivery to the medical facility, through writing your prehospital care report. In addition to the many new photographs and illustrations, in the “clinical” chapters (on airway care, the medical chapters, and the trauma chapters) you will find:

- Integration of pediatrics and geriatric pathophysiology, assessment and emergency care into each chapter where relevant
 - Assessment Tips
 - Pathophysiology Pearls
 - Drug Profiles
 - Assessment Summaries
- National Association of EMS State Officials National Model EMS Clinical Guidelines
 - Emergency Care Protocols
 - Emergency Care Algorithms
 - Pathophysiology notes within the Case Study Follow-Ups to explain the “why” of what you observe about the patient

And a special feature that appears throughout Chapter 13, “Patient Assessment”:

- Critical Findings

which explains, at every step of the assessment, critical conditions/signs/symptoms you may find . . . what might be causing them . . . and specifically, what you should do when your assessment of the patient reveals one of these critical findings.

EMTs are often taught **WHAT** signs and symptoms they should expect to see in certain conditions and **WHAT** should be done; however, the **WHY** of assessment and emergency care is often not well addressed. Three of the features, “Pathophysiology Pearls,” “Assessment Tips,” and the new pathophysiology notes in the clinical-chapter Case Study Follow-Ups—in addition to expanded discussion within the chapters—provide you with a basic understanding so that you can better comprehend **WHY** you are seeing signs and symptoms and **WHY** you are providing specific emergency care.

- The Assessment Summaries, National Association of EMS State Officials National Model EMS Clinical Guidelines, Emergency Care Protocols, Emergency

Care Algorithms, and Critical Thinking features provide the most up-to-date strategies for providing competent care. These features and the entire text have been updated to conform to the latest NHTSA's 2021 National Emergency Medical Services Education Standards, NHTSA's 2019 National EMS Scope of Practice Model, National Association of State EMS Officials' 2022 National Model EMS Clinical Guidelines, the American Heart Association's 2020 Guidelines for CPR and ECC, American Stroke Association's latest Prehospital/EMS Care Stroke Guidelines, American College of Surgeons American Trauma Life Support (ATLS) 10th edition course, and the American College of Surgeons Committee on Trauma Prehospital Trauma Life Support 9th edition 2020 course.

In Your EMS Career

In your EMS career, you will respond to a variety of calls in uncontrolled environments requiring confidence, compassion, and a high degree of competence. As an EMT, you will be put to the test to think critically and respond instantaneously. The foundation for these skills will be provided in your education program; you will learn further and gain better clinical insight through patient contact, continuing education, and experience. Once you have read this textbook and complete your EMT program, you will have only begun your educational experience as an EMT. Every day you should strive to learn something new that may enhance your emergency patient care. Because of the dynamic nature of emergency medical services, you will become a lifelong learner.

Pathophysiology

As an EMT, you will be required to learn about many patient conditions and injuries that you will encounter in the prehospital environment. Identifying these conditions and injuries is most often based on the recognition of specific signs and symptoms and history findings. Not only is it difficult to memorize the myriad of signs and symptoms for each condition or injury, it is not desirable, because not every patient presents with just one condition or injury or all of the same signs and symptoms. A good basic foundation of pathophysiology helps you to understand and explain the “why” behind the patient presentation. There is no need to memorize when you understand and can explain why each sign or symptom is occurring. Putting this together with a fundamental understanding of the pathophysiology of the conditions and a thorough approach to patient assessment will allow you to quickly recognize immediate life threats and provide excellent emergency care. Don't memorize, but understand. This is the foundation to making “it all make sense!”

The Importance of Patient Assessment

Patient assessment is one of the most important skills that an EMT performs, requiring good practical ability and also the capability to think critically. You must take each finding from the assessment, determine if an immediate life-saving intervention is required, store the information learned in the back of your mind as you continue with the assessment, and finally put all the pieces of the assessment together to provide effective emergency medical care. The challenge is similar to putting a puzzle together. You start out with individual pieces of the puzzle that have to be connected to form a meaningful picture. The pieces of the puzzle correlate to signs, symptoms, and other findings of the assessment. You must take the findings, consider them individually, and then put them together to form a whole picture of your patient. Specific findings are meaningless without fitting them into the entire picture.

Prehospital Emergency Care, 12th Edition, provides a strong, comprehensive approach to patient assessment, which is reinforced at several points in the chapters—in the Case Study, chapter text, Assessment-Based Approach, Assessment Summaries, and Algorithms. This approach reinforces assessment information and also provides an alternative learning method. You will find the necessary clinical information integrated into the assessment approach for each section, unlike other sources that integrate the assessment information into the clinical information.

This textbook uses a two-tiered approach to teaching emergency medical care: assessment based and diagnostic based. An assessment-based approach to patient injuries and illnesses teaches you to identify life-threatening conditions and provide immediate interventions to reverse those problems. An assessment-based approach to acute patient care is followed no matter what level of care is provided. Once you have managed life-threatening conditions, you will then move to the next level of assessment, the diagnostic-based approach. The diagnostic-based approach entails putting the signs, symptoms, and other assessment findings together to come to a probability of what conditions the patient may be suffering from. Many EMS providers refer to this as their “differential field impression.” *Prehospital Emergency Care*, 12th Edition, presents the necessary information to move naturally, successfully, and effectively from the assessment-based approach to the diagnostic-based approach.

Using Medical Terminology

As you progress through your education program, you will learn a new system of communication that involves the use of appropriate medical terminology. It is important to establish a basic understanding of medical terminology so that you may communicate effectively,

both orally and in writing, with other members of the medical team. *Prehospital Emergency Care*, 12th Edition, addresses medical terminology in Chapter 7, “Anatomy, Physiology, and Medical Terminology,” and has integrated a basic foundation of medical terminology into each chapter (see the terms in bold type and the glossary at the end of the book) that will help you to enhance your professional image and communication skills. You should expand your medical terminology base as you continue your education.

As You Begin Your EMS Career

We wish you the best of luck as you begin your career in emergency medical services. Our best piece of advice to you is to provide the best emergency care possible and always do what is right for the patient. This will allow you to contribute to the mission of emergency medical services.

Good luck and best wishes!

Joseph J. Mistovich

What's New in the 12th Edition?

Prehospital Emergency Care, 12th Edition, continues to meet the National EMS Education Standards published by the National Highway Traffic Safety Administration in 2009 and to reflect the latest and best medical knowledge and practices in emergency medical services in the United States. Recognizing, as well, that equipment, standards, and practices vary from one state and local EMS service to another, the statement “follow local protocols” appears in numerous places throughout the text.

The content of *Prehospital Emergency Care*, 12th Edition, is summarized here, with emphasis on “what’s new” in this edition. The text’s table of contents is organized to follow the National EMS Educational Standards.

What's New in Prehospital Emergency Care 12th edition

- Meets NHTSA's 2021 National Emergency Medical Services Education Standards
- Meets NHTSA's 2019 National EMS Scope of Practice Model
- Meets National Association of State EMS Officials' 2022 National Model EMS Clinical Guidelines
- Meets the American Heart Association's 2020 Guidelines for CPR and ECC
- Meets the American Stroke Association's latest Prehospital/EMS Care Stroke Guidelines
- Meets the American College of Surgeons American Trauma Life Support (ATLS) 10th edition course
- Meets the American College of Surgeons Committee on Trauma Prehospital Trauma Life Support 9th edition 2020 course
- Pediatrics and Geriatrics chapters have been deleted with the material being addressed in every clinical chapter. Many chapters have specific sections for geriatrics and pediatrics to ensure the material is covered at adequate depth and breadth.
- The actual National Association of State EMS Officials' 2022 National Model EMS Clinical Guidelines have been added as protocol sections to each chapter where relevant.
- A new chapter (26) Vulnerable Populations: Psychiatric Emergencies and Psychosocial Issues has been added to address and put more emphasis on issues in cultural humility, child abuse, geriatric abuse, human trafficking, sexual assault, the mental health system, acute psychosis, suicide ideation, excited delirium, anxiety, depression, medical fear, substance abuse disorders, PTSD, homelessness, and poverty.
- Chapter 1 Emergency Medical Service Systems, Research, and Public Health:
 - An entire section “Public Health and EMS” has been added to address the integration and role of EMS in public health, especially following the COVID-19 pandemic.
- Chapter 2 Workforce Safety, Wellness, and Resilience of the EMT:
 - A section on “Resilience of the EMT” and “Suicide in the EMT” has been added to address the increase in EMS suicides.
- Chapter 3 Medical, Legal, Ethical Issues:
 - “End of Life Care Advance Directions” section has been added to cover the various end-of-life legal documents with greater explanation to include The Living Will, Durable Power of Attorney for Health Care, Do Not Resuscitate, POLST and MOLST.
 - NASEMSO Emergency Care Protocol for DNR/POA has been added.
 - NASEMSO Emergency Care Protocol for Patient Refusals has been added.
 - NASEMSO Emergency Care Protocol for Determination of Death/Withholding Resuscitative Efforts has been added.
- Chapter 4 Documentation:
 - A section “Documentation to Support Medical Necessity” has been added to include Commercial Insurance, Medicare, Medicaid, The ET3 Payment Method.
- Chapter 5 Communication:
 - A section on “Telemedicine” and “Family-Centered Care” has been added.
- Chapter 7 Anatomy, Physiology, and Medical Terminology:
 - Separate sections on “Pediatric Anatomy and Physiology” and “Geriatric Anatomy and Physiology” have been added to integrate the pediatric and geriatric anatomy and physiology into the chapter.
- Chapter 10 Airway Management, Ventilation, and Oxygenation:
 - “Special Considerations in Geriatric Airway Management: has been added.
 - “High-Flow Oxygen Therapy (HFOT)” section has been added.
 - “Special Considerations of Airway Management, Ventilation, and Oxygen Therapy in the Pediatric Patient” has been integrated into the chapter.
 - “Foreign Body Airway Obstruction” has been integrated into the chapter.
 - New AHA 2020 oxygen guidelines for acute coronary syndrome are addressed.
 - A new section on “Indications and Special Considerations for Oxygen Administration” addressing the variations in oxygen therapy in the medical patient, trauma patient, acute coronary syndrome patient, pregnant patient, inhaled poisoning patient, and chronic obstructive disease (COPD) patient has been added.
 - “Special Oxygen Therapy Considerations in the Pediatric Patient” has been added.
- Chapter 11 Vital Signs, Monitoring Devices, and History Taking:
 - Capnography (EtCO₂), blood glucose, pain assessment, and body temperature have been added as other vital signs to be assessed.
 - A section on “12-Lead Electrode Placement” has been added.
 - A section on “Blood Glucose Level (BGL) Measurement” has been added.
 - A section on “Assessing Pain Levels Using a Pain Scale” has been added to include information on the

- Wong-Baker FACES Pain Scale and the FLACC Pain Scale.
- A section on “Obtaining the Temperature: Core vs. Peripheral” has been added.
- “Special Considerations for Assessing the Vital Signs in the Pediatric Patient” section has been integrated into the chapter.
- A section on “Special Considerations for Taking a History in the Pediatric Patient” has been integrated into the chapter.
- A section on “Special Considerations for Taking a History in the Elderly Patient” has been integrated into the chapter.
- Chapter 13 Patient Assessment:
 - “Variations to the Primary Assessment for Trauma: MARCH and XABCDE” has been added to address the need to stop the bleeding as a priority in the trauma patient.
 - The new American College of Surgeons Committee on Trauma 2022 National Guidelines for Field Triage of Injured Patients has been added.
 - The combined adult and pediatric Glasgow Coma Scale has been added.
 - Pain and body temperature have been added as vital signs to assess.
 - A section entitled “Special Assessment Considerations in the Pediatric Patient” has been added to address the specific assessment techniques and findings in the pediatric patient to include the integration of the Pediatric Assessment Triangle (PAT) and Pediatric Advanced Life Support (PALS) Initial Impression criteria.
 - A section entitled “Special Assessment Considerations in the Geriatric Patient” has been added to address the specific assessment techniques and findings in the geriatric patient.
- Chapter 14 General Pharmacology and Medication Administration:
 - Polypharmacy, acute and chronic medications have been added.
 - A section on “Ibuprofen” and “Acetaminophen” have been added for pain relief and fever.
 - The addition of inhalation of isopropyl alcohol to relieve nausea.
 - “Pralidoxime Chloride (2-PAM) and Atropine have been added for treatment of organophosphate and nerve agent poisoning to include indications for administration, dose and the use of the DuoDote autoinjector.
- Chapter 15 Shock and Resuscitation:
 - All information has been updated to meet the AHA 2020 CPR and ECC Guidelines.
 - “Special Shock Considerations in the Pediatric Patient” has been integrated into the chapter.
 - NASEMSO Emergency Care Protocol for Shock has been added.
 - The AHA Chain of Survival has been updated to meet the 2020 Guidelines.
 - “Special Cardiac Arrest Considerations in the Pediatric Patient” has been integrated into the chapter.
 - “Sudden Infant Death Syndrome” has been added as a section.
- Chapter 16 Respiratory Emergencies:
 - Bronchiolitis, epiglottitis, and Croup have been integrated into the chapter.
 - A section on “Sympathetic Crashing Acute Pulmonary Edema (SCAPE)” has been added to the chapter.
 - NASEMSO Emergency Care Protocol for Respiratory Distress, Bronchospasm, and Pulmonary Edema has been added.
 - A section entitled “Special Considerations for Respiratory Emergencies in the Pediatric Patient” has been integrated into the chapter.
 - A section entitled “Specific Pediatric Respiratory Conditions Causing Respiratory Distress or Failure” has been integrated into the chapter.
 - NASEMSO Emergency Care Protocol for Pediatric Respiratory Distress—Croup has been added.
 - NASEMSO Emergency Care Protocol for Pediatric Respiratory Distress—Bronchiolitis has been added.
 - A section entitled “Special Considerations for Respiratory Emergencies in the Geriatric Patient” has been integrated into the chapter.
- Chapter 17 Cardiovascular Emergencies:
 - Role of the EMT in 12-Lead ECG acquisition is addressed.
 - The new AHA 2020 oxygen therapy guidelines in acute coronary syndrome are covered.
 - A section on “Ventricular Assist Devices (VADs) has been added.
 - NASEMSO Emergency Care Protocol for Implantable Ventricular Assist Devices has been added.
 - A section entitled “Special Considerations in the Pediatric Patient” has been integrated into the cardiovascular emergencies chapter.
 - NASEMSO Emergency Care Protocol for Chest Pain/Acute Coronary Syndrome (ACS) has been added.
- Chapter 18 Altered Mental Status, Stroke, Headache:
 - A section entitled “Special Altered Mental Status Considerations in the Pediatric Patient” has been integrated into the chapter.
 - A section on Brief Resolved Unexplained Events (BRUE) has been added.
 - A section entitled “Special Altered Mental Status Considerations in the Geriatric Patient” has been integrated into the chapter.
 - “Dementia” and “Delirium” have been integrated into the chapter.
 - A section on Alzheimer’s Disease has been added.
 - “Homunculus of Brain” for motor and sensory distribution has been added.
 - A section on “FAST VAN” stroke assessment has been added to the large vessel occlusion screening tools.
 - A section on “mobile stroke units” has been added.
 - NASEMSO Emergency Care Protocol for Suspected Stroke/Transient Ischemic Attack has been added.
- Chapter 19 Seizures and Syncope:
 - Seizure terminology has been updated to adhere to the latest information published by the Epilepsy Foundation.
 - A section on “Psychogenic Seizures” has been added.
 - NASEMSO Emergency Care Protocol for Seizures has been added.