An Introduction to Clinical Emergency Medicine
Second edition
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Clinical Emergency Medicine

Second edition

Edited by

S.V. Mahadevan, MD
Associate Chief, Division of Emergency Medicine
Associate Professor of Surgery (Emergency Medicine)
Director, Stanford Emergency Medicine International
Stanford University School of Medicine, and
Emergency Department Medical Director
Stanford University Medical Center, Stanford, CA, USA

Gus M. Garmel, MD
Co-Program Director, Stanford/Kaiser Emergency Medicine Residency
Clinical Professor (Affiliated) of Surgery (Emergency Medicine)
Clerkship Director, Surgery 313D (Emergency Medicine)
Stanford University School of Medicine
Senior Staff Emergency Physician, The Permanente Medical Group
Kaiser Permanente Medical Center, Santa Clara, CA, USA
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Contributors

Kumar Alagappan, MD, FACEP, FAAEM, FIFEM
Associate Chairman, Department of EM
Long Island Jewish Medical Center
Professor of Clinical Emergency Medicine
Albert Einstein College of Medicine
New Hyde Park, NY

Janet G. Alteveer, MD, FACEP
Associate Professor of Emergency Medicine
Robert Wood Johnson Medical School, Camden
University of Medicine and Dentistry of New Jersey
Attending Physician and Faculty, EM Residency
Cooper University Hospital
Camden, NJ

Kim Askew, MD, FAAP
Assistant Professor
Director, Undergraduate Medical Education
Department of Emergency Medicine
Wake Forest University School of Medicine
Winston-Salem, NC

Paul S. Auerbach, MD, MS, FACEP, FAWM
Redlich Family Professor of Surgery
Division of Emergency Medicine
Stanford University School of Medicine
Stanford, CA

Katherine Bakes, MD
Associate Professor of Emergency Medicine
University of Colorado School of Medicine
Director, Denver Emergency Center for Children
Associate Director, Emergency Department
Denver Health Medical Center
Denver, CO

Kip Benko, MS, MD, FACEP
Associate Clinical Professor of Emergency Medicine
University of Pittsburgh School of Medicine
Faculty, University of Pittsburgh Medical Center
Pittsburgh, PA

Paul D. Biddinger, MD, FACEP
Assistant Professor in the Department of Health Policy and Management, Harvard School of Public Health
Assistant Professor of Surgery, Harvard Medical School
Director of Operations, Department of EM
Medical Director for Emergency Preparedness
Massachusetts General Hospital
Boston, MA

Victoria Brazil, MBBS, FACEM, MBA
Senior Staff Specialist, Department of EM
Royal Brisbane and Women’s Hospital
Associate Professor, Division of Critical Care and Anaesthesiology
School of Medicine, University of Queensland
Director, Queensland Medical Education and Training
Queensland Health, Australia

Anthony FT Brown, MBChB, FACEM
Professor and Senior Staff Specialist
Department of Emergency Medicine
Royal Brisbane and Women’s Hospital
Brisbane, Australia
Editor-in-Chief of *Emergency Medicine Australasia*

Andrew K. Chang, MD, MS
Associate Professor of Emergency Medicine
Albert Einstein College of Medicine
Attending Physician
Montefiore Medical Center
Bronx, NY

Alice Chiao, MD
Clinical Instructor, Emergency Medicine
Clerkship Director, Stanford University School of Medicine
Stanford, CA

Wendy C. Coates, MD
Professor of Medicine and Chair, Acute Care College
David Geffen School of Medicine at UCLA
Director, Medical Education
Director, Fellowship in Medical Education
Harbor-UCLA Emergency Medicine
Los Angeles, CA

Jamie Collings, MD
Executive Director of Innovative Education
Associate Professor, Emergency Medicine
Northwestern University, Feinberg School of Medicine
Department of EM
Chicago, IL

Gilbert Abou Dagher, MD
Department of Emergency Medicine
Henry Ford Hospital
Detroit, MI

Jonathan E. Davis, MD, FACEP, FAAEM
Associate Program Director
Associate Professor of Emergency Medicine
Department of Emergency Medicine
Georgetown University Hospital & Washington Hospital Center
Washington, DC

Peter DeBlieux, MD, FAAEM, FACEP
LSUHSC Professor of Clinical Medicine
Director of Emergency Medicine Services, Interim
Louisiana Public Hospital
LSUHSC Emergency Medicine Director of Faculty and Resident Development
Clinical Professor of Surgery
Tulane University School of Medicine
New Orleans, LA
Contributors

Alessandro Dellai, MD
Attending Emergency Medicine Physician
Lynchburg General Hospital
Lynchburg, VA

Emily Doelger, MD
Simulation fellow, Royal North Shore Hospital
Sydney, Australia

Pamela L. Dyne, MD, FACEP, FAAEM
Professor of Clinical Medicine (Emergency Medicine)
David Geffen School of Medicine at UCLA
Director of Medical Student Education
Department of Emergency Medicine
Olive View-UCLA Medical Center
Sylmar, CA

Gino Farina, MD, FACEP, FAAEM
Program Director, Department of Emergency Medicine
Long Island Jewish Medical Center
Associate Professor EM
Hofstra NSLIJ School of Medicine
Adjunct Associate Professor EM
Albert Einstein College of Medicine
New Hyde Park, NY

Robert Galli, MD, FACEP
Professor of Emergency and Internal Medicine
Director of the Office of Telehealth
Executive Director of TelEmergency
Director SAN
Medical Director, AirCare
University of Mississippi Medical Center
State EMS Medical Director
Mississippi Department of Health
Jackson, MS

Gus M. Garmel, MD, FACEP, FAAEM
Co-Program Director, Stanford/Kaiser EM Residency
Clinical Professor (Affiliated) of Surgery (EM)
Clerkship Director, Surgery 313D (EM)
Stanford University School of Medicine, Stanford, CA
Senior Editor, The Permanente Journal, Portland, OR
Chair, Kaiser National Emergency Medicine Conference
Senior Emergency Physician, Permanente Medical Group
Santa Clara, CA

Daniel Garza, MD
Assistant Professor
Department of Orthopaedic Surgery & Department of Surgery (EM)
Stanford University School of Medicine and Sports Medicine Center
Medical Director, San Francisco 49ers
Stanford, CA

Laleh Charahbaghian, MD, FAAEM
Director, Emergency Ultrasound
Co-Director, Emergency Ultrasound Fellowship
Clinical Instructor, Stanford University Medical Center
Division of Emergency Medicine, Department of Surgery
Stanford, CA

Gregory H. Gilbert, MD, FAAEM
Assistant Clinical Professor
Stanford University School of Medicine
EMS Fellowship Director, Division of Emergency Medicine
Assistant Chief VA Hospital, Palo Alto
Medical Director San Mateo County
Palo Alto, CA

Michael A. Gisondi, MD, FACEP, FAAEM
Associate Professor of Emergency Medicine
Residency Director
Northwestern University–The Feinberg School of Medicine
Chicago, IL

Steven Go, MD
Associate Professor of Emergency Medicine
Department of Emergency Medicine
University of Missouri – Kansas City School of Medicine
Truman Medical Center, Hospital Hill
Kansas City, MO

Jeffrey M. Goodloe, MD, NREMT-P, FACEP
Medical Director – Medical Control Board, Emergency Medical Services for Metropolitan Oklahoma City & Tulsa
Associate Professor & EMS Division Director
Department of Emergency Medicine
University of Oklahoma School of Community Medicine
Tulsa, OK

Swaminatha V. Gurudevan, MD, FCC, FASE, FSCCT
Assistant Director, Cardiac Noninvasive Laboratories
Cedars-Sinai Heart Institute
Associate Clinical Professor of Medicine
UCLA David Geffen School of Medicine
Los Angeles, CA

Micelle J. Haydel, MD
Program Director, Emergency Medicine Residency
Associate Clinical Professor, Section of EM
Louisiana State University Health Science Center
New Orleans, LA

Stephen R. Hayden, MD, FAAEM, FACEP
Professor of Clinical Medicine
Editor-in-Chief, Journal of Emergency Medicine
Associate Dean for Graduate Medical Education & DIO
UCSD Medical Center
San Diego, CA

Corey R. Heitz, MD
Assistant Professor
Director, Medical Student Clerkship
Department of Emergency Medicine
Boonshoft School of Medicine, Wright State University
Dayton, OH

Gregory W. Hendey, MD, FACEP, FAAEM
Professor of Clinical Emergency Medicine
UCSF School of Medicine
Vice Chair and Research Director
UCSF Fresno Department of Emergency Medicine
Fresno, CA
Contributors

Brian Lin, MD, FAAEM
Assistant Clinical Professor
UCSF Department of Emergency Medicine
Kaiser Permanente, San Francisco
San Francisco, CA

Michelle Lin, MD
Associate Professor of Emergency Medicine
University of California, San Francisco
San Francisco General Hospital and Trauma Center
San Francisco, CA

Douglas Lowery-North, MD
Associate Professor of Emergency Medicine
Vice Chairman of Emory Healthcare Clinical Operations
The Emory Clinic Emory University Hospital
Atlanta, GA

Sharon E. Mace, MD, FACEP, FAAP
Professor on Medicine, Case Western Reserve University
Faculty, MetroHealth/Cleveland Clinic EM Residency
Director, Observation Unit, Pediatric Education/QI and Research for Rapid Response Team
Cleveland, OH

S. V. Mahadevan, MD, FACEP, FAAEM
Associate Professor of Surgery/Emergency Medicine
Associate Chief, Division of Emergency Medicine
Director, Stanford Emergency Medicine International
Stanford University School of Medicine
Emergency Department Medical Director
Stanford University Medical Center
Stanford, CA

Thomas M. Mailhot, MD, RDMS
Assistant Professor of Clinical Emergency Medicine
Co-Director, Emergency Ultrasound
Los Angeles County + USC Medical Center
Los Angeles, CA

Diku Mandavia, MD, FACEP, FRCP
Associate Clinical Professor in Emergency Medicine
Department of Emergency Medicine
Los Angeles County + USC Medical Center
Los Angeles, CA

David E. Manthey, MD, FACEP, FAAEM
Professor and Vice Chair of Education
Department of Emergency Medicine
Wake Forest University School of Medicine
Winston-Salem, NC

Jorge A. Martinez, MD, JD, FACEP, FACP
Professor of Clinical Medicine
Program Director, LSUHSC Internal Medicine, IM/EM, and IM/Dermatology Residency Programs
Sections of Emergency Medicine and Hospitalist Medicine
Louisiana State University Health Sciences Center
New Orleans, LA

Amal Mattu, MD, FAAEM, FACEP
Professor and Vice Chair
Director, Emergency Cardiology and Faculty Development Fellowships
Department of Emergency Medicine
University of Maryland School of Medicine
Baltimore, MD

Mel Herbert, MD, MBBS, BMedSci, FACEP, FAAEM
Associate Professor of Emergency Medicine,
Keck School of Medicine
Faculty: LAC+USC Medical Center
Editor EMRAP
Los Angeles, CA

Cherri Hobgood, MD, FACEP
Professor and Chair
Department of Emergency Medicine
Indiana University School of Medicine
Indianapolis, IN

Michelle Hxton, MD
Assistant Professor of Clinical Medicine, UKMC
Saint Luke’s Medical Center
Kansas City, MO

Loreto Jackson-Williams, MD, PhD, FACEP
Associate Professor
Department of Emergency Medicine
Associate Dean for Academic Affairs
University of Mississippi School of Medicine
Jackson, MS

Anja K. Jaehne, MD
Research Coordinator, Emergency Medicine
Henry Ford Hospital
Detroit, MI

Mary Beth Johnson, MD
Assistant Clinical Professor of Medicine
Associate Emergency Ultrasound Fellowship Director
University of California, San Diego School of Medicine
San Diego, CA

H. Brendan Kelleher, MD
Assistant Professor of Emergency Medicine
Keck School of Medicine at USC
Los Angeles County + USC Medical Center
Los Angeles, CA

Peter G Kumasaka, MD, FAAEM
Co-Director of Emergency Medicine Ultrasound
Assistant Professor of Clinical Medicine, University of Minnesota School of Medicine
Regions Hospital Department of Emergency Medicine
St Paul, MN

Melissa J. Lamberson, MD
Assistant Professor, Department of Emergency Medicine
Emory University School of Medicine
Atlanta, GA

Mary Lantot-Herbert, FNP
Assistant Professor of Nursing, UCLA School of Nursing
Staff NP
Olive View-UCLA Medical Center
Sylmar, CA

Erik Laurin, MD, FAAEM, FACEP
Associate Professor of Emergency Medicine
Director of Medical Student Education
University of California, Davis
Sacramento, CA
<table>
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<th>Name</th>
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<tr>
<td>Rita Oregon, MD, FACOG</td>
<td>Associate Clinical Professor</td>
</tr>
<tr>
<td></td>
<td>David Geffen School of Medicine</td>
</tr>
<tr>
<td></td>
<td>Chief of Ambulatory OB/GYN Services</td>
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<td></td>
<td>Olive View-UCLA Medical Center</td>
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<td></td>
<td>Sylmar, CA</td>
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<tr>
<td>Phillips Perera, MD, RDMS, FACEP</td>
<td>Associate Clinical Professor in Emergency Medicine</td>
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<td></td>
<td>Co-Director, Emergency Ultrasound</td>
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<td></td>
<td>Department of Emergency Medicine</td>
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<td></td>
<td>Los Angeles County + USC Medical Center</td>
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<td></td>
<td>Los Angeles, CA</td>
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<tr>
<td>Susan B. Promes, MD, FACEP</td>
<td>Professor of Emergency Medicine</td>
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<tr>
<td></td>
<td>University of California, San Francisco</td>
</tr>
<tr>
<td></td>
<td>Program Director, UCSF-SFGH EM Residency</td>
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<tr>
<td></td>
<td>Vice Chair for Education</td>
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<td></td>
<td>Director of Curricular Affairs for GME</td>
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<td></td>
<td>San Francisco, CA</td>
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<tr>
<td>Emanuel P. Rivers, MD, MPH, IOM</td>
<td>Vice Chairman and Research Director</td>
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<td></td>
<td>Department of Emergency Medicine</td>
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<td></td>
<td>Attending Staff, Emergency Medicine and Surgical</td>
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<td></td>
<td>Critical Care, Henry Ford Hospital</td>
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<td></td>
<td>Clinical Professor, Wayne State University</td>
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<td></td>
<td>Detroit, MI</td>
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<tr>
<td>John S. Rose, MD, FACEP</td>
<td>Professor of Emergency Medicine</td>
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<td></td>
<td>University of California, Davis Health System</td>
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<td>Sacramento, CA</td>
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<tr>
<td>Carolyn J. Sachs, MD, MPH, FACEP</td>
<td>Professor of Clinical Emergency Medicine</td>
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<td>University of California, Los Angeles</td>
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<td>Los Angeles, CA</td>
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<td>Jairo I. Santanilla, MD</td>
<td>Clinical Assistant Professor of Medicine</td>
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<td>Rawle A. Seupaul, MD</td>
<td>Associate Clinical Professor</td>
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<td>Fred A. Severyn, MD, FACEP</td>
<td>Associate Professor of Emergency Medicine</td>
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<td>University of Colorado School of Medicine</td>
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<td></td>
<td>Aurora, CO</td>
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<tr>
<td>Ghazala Q. Sharief, MD, FACEP</td>
<td>Director of Pediatric Emergency Medicine</td>
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<tr>
<td></td>
<td>Palomar-Pomerado Health System/California</td>
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<td>Emergency Physicians</td>
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<td>Clinical Professor</td>
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<td>University of California, San Diego</td>
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<td>Lynne McCullough, MD, FACEP</td>
<td>Medical Director</td>
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<tr>
<td></td>
<td>UCLA Ronald Reagan Hospital Emergency Department</td>
</tr>
<tr>
<td></td>
<td>Associate Professor of Medicine/Emergency Medicine</td>
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<td>Steve McLaughlin, MD, FACEP</td>
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<td>Timothy Meyers, MD, MS</td>
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<td>Gregory J. Moran, MD, FACEP, FAAEM, FIDSA</td>
<td>Professor of Medicine</td>
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<td>Geffen School of Medicine at UCLA</td>
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<td>Randall T. Myers, MD</td>
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<td>Christopher R.H. Newton, MD, FACEP</td>
<td>Attending Physician, St Joseph Mercy Hospital</td>
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<td>President and CEO, Emergency Physicians Medical Group</td>
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<td>Flavia Nobay, MD</td>
<td>Assistant Professor of Emergency Medicine</td>
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<td>University of Rochester</td>
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<td>Robert L. Norris, MD, FACEP, FAAEM</td>
<td>Professor of Surgery</td>
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<td>Chief, Division of Emergency Medicine</td>
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<td>Stanford University School of Medicine</td>
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<tr>
<td>Catherine Oliver, MD, FACEP</td>
<td>Assistant Professor of Surgery</td>
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<td></td>
<td>John A. Burns School of Medicine/University of Hawaii Emergency Medicine Clerkship Director</td>
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<tr>
<td></td>
<td>Emergency Ultrasound Director, Queens Medical Center</td>
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<td>Honolulu, HI</td>
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<td>Jennifer A. Oman, MD, MBA, FACEP, FAAEM, RDMS</td>
<td>Associate Clinical Professor of Emergency Medicine</td>
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<td>Department of Emergency Medicine</td>
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<td>University of California, Irvine</td>
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<td>Irvine, CA</td>
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Contributors
Sophie Terp, MD, MPH
UCLA/Olive View-UCLA Emergency Medicine
Los Angeles, CA

R. Jason Thurman, MD, FAAEM
Associate Professor of Emergency Medicine
Associate Director, Residency Program
Director of Quality and Patient Safety
Department of Emergency Medicine
Associate Director, Vanderbilt Stroke Center
Vanderbilt University Medical Center
Nashville, TN

David A. Wald, DO, FAAEM, FACOEP-Dist.
Associate Professor of Emergency Medicine
Director of Undergraduate Medical Education
Department of Emergency Medicine
Medical Director, William Maul Measey Institute for Clinical Simulation and Patient Safety
Temple University School of Medicine
Philadelphia, PA

Sarah R. Williams, MD, FACEP, FAAEM
Clinical Assistant Professor
Department of Surgery, Division of Emergency Medicine
Stanford University School of Medicine
Associate Director, Stanford/Kaiser EM Residency
Co-Director, EM Ultrasound Program and Fellowship
Stanford, CA

Teresa S. Wu, MD, FACEP
Emergency Physician, Boulder Community Hospital
Team Physician, Garmin-Cervélo Professional Cycling Team
Owner, Thrive Health and Fitness Medicine
Boulder, CO

Lee W. Shockley, MD, MBA, FACEP, FAAEM, CPE
Professor of Emergency Medicine
University of Colorado School of Medicine
Emergency Department Medical Director
Denver Health Medical Center
Denver, CO

Stefanie Simmons, MD
Research Core Faculty
St. Joseph Mercy Hospital, Ann Arbor
Clinical Faculty, Saline Hospital
Saline, MI

Barry C. Simon, MD
Professor of Emergency Medicine
University of California, San Francisco
Chairman of the Department of Emergency Medicine
Highland General Hospital/Alameda County Medical Center
Oakland, CA

Shannon Sovndal, MD, FACEP
Emergency Physician, Boulder Community Hospital
Team Physician, Garmin-Cervélo Professional Cycling Team
Owner, Thrive Health and Fitness Medicine
Boulder, CO

George Sternbach, MD, FACEP
Clinical Professor of Surgery
Stanford University Hospital
Emergency Physician, Seton Medical Center
Daly City, CA

Matthew Strehlow, MD, FAAEM
Clinical Assistant Professor of Surgery/EM
Associate Medical Director
Director, Clinical Decision Area
Division of Emergency Medicine
Stanford, CA

Eustacia (Jo) Su, MD
Staff Physician
Portland VA Medical Center
Portland, OR

Stuart P. Swadron, MD, FRCPC, FAAEM, FACEP
Chair for Education and Associate Professor
Department of Emergency Medicine
Los Angeles County/USC Medical Center
Keck School of Medicine, University of Southern California
Los Angeles, CA

Jeffrey A. Tabas, MD, FACEP, FAAEM
Professor of Emergency Medicine
University of California San Francisco
Director of Outcomes and Innovations
UCSF Office of Continuing Medical Education
San Francisco, CA

Lee W. Shockley, MD, MBA, FACEP, FAAEM, CPE
Professor of Emergency Medicine
University of Colorado School of Medicine
Emergency Department Medical Director
Denver Health Medical Center
Denver, CO

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Research Core Faculty
St. Joseph Mercy Hospital, Ann Arbor
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Saline, MI

Barry C. Simon, MD
Professor of Emergency Medicine
University of California, San Francisco
Chairman of the Department of Emergency Medicine
Highland General Hospital/Alameda County Medical Center
Oakland, CA

Shannon Sovndal, MD, FACEP
Emergency Physician, Boulder Community Hospital
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Boulder, CO

George Sternbach, MD, FACEP
Clinical Professor of Surgery
Stanford University Hospital
Emergency Physician, Seton Medical Center
Daly City, CA

Matthew Strehlow, MD, FAAEM
Clinical Assistant Professor of Surgery/EM
Associate Medical Director
Director, Clinical Decision Area
Division of Emergency Medicine
Stanford, CA

Eustacia (Jo) Su, MD
Staff Physician
Portland VA Medical Center
Portland, OR

Stuart P. Swadron, MD, FRCPC, FAAEM, FACEP
Chair for Education and Associate Professor
Department of Emergency Medicine
Los Angeles County/USC Medical Center
Keck School of Medicine, University of Southern California
Los Angeles, CA

Jeffrey A. Tabas, MD, FACEP, FAAEM
Professor of Emergency Medicine
University of California San Francisco
Director of Outcomes and Innovations
UCSF Office of Continuing Medical Education
San Francisco, CA

Lee W. Shockley, MD, MBA, FACEP, FAAEM, CPE
Professor of Emergency Medicine
University of Colorado School of Medicine
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Denver Health Medical Center
Denver, CO

Stefanie Simmons, MD
Research Core Faculty
St. Joseph Mercy Hospital, Ann Arbor
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Saline, MI

Barry C. Simon, MD
Professor of Emergency Medicine
University of California, San Francisco
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Highland General Hospital/Alameda County Medical Center
Oakland, CA

Shannon Sovndal, MD, FACEP
Emergency Physician, Boulder Community Hospital
Team Physician, Garmin-Cervélo Professional Cycling Team
Owner, Thrive Health and Fitness Medicine
Boulder, CO

George Sternbach, MD, FACEP
Clinical Professor of Surgery
Stanford University Hospital
Emergency Physician, Seton Medical Center
Daly City, CA

Matthew Strehlow, MD, FAAEM
Clinical Assistant Professor of Surgery/EM
Associate Medical Director
Director, Clinical Decision Area
Division of Emergency Medicine
Stanford, CA

Eustacia (Jo) Su, MD
Staff Physician
Portland VA Medical Center
Portland, OR

Stuart P. Swadron, MD, FRCPC, FAAEM, FACEP
Chair for Education and Associate Professor
Department of Emergency Medicine
Los Angeles County/USC Medical Center
Keck School of Medicine, University of Southern California
Los Angeles, CA

Jeffrey A. Tabas, MD, FACEP, FAAEM
Professor of Emergency Medicine
University of California San Francisco
Director of Outcomes and Innovations
UCSF Office of Continuing Medical Education
San Francisco, CA
Foreword

Although Emergency Medicine is a comparatively young specialty, it already boasts a good number of textbooks, many of which are quite good. There is a real place for the book you are holding, however, not merely because its editors are outstanding educators or because it’s particularly well written, or because it pays careful attention to details (although all of these are true). *An Introduction to Clinical Emergency Medicine, 2nd edition*, is a valuable tool for the right reader because it is addressed to a specific audience, and because of its extremely appropriate complaint-based approach. Before we think more about those of our patients presenting with undifferentiated illness, we need to reflect a little about the specialty of EM itself.

Some medical specialties are the product of a particular and circumscribed body of knowledge. Endocrinology, for example, came into being when new and complex information about human hormones began to be known, leading to a more and more complex understanding of metabolic processes and diseases; some patient problems required a degree of sophistication beyond the scope of generalist practitioners. The same process undoubtedly occurred for most or all of the medical sub-specialties, diagnostic radiology, neurology … and many others. Most surgical specialties, on the other hand (as well as some others, such as interventional radiology), focused less on special knowledge than on special skills.

EM is somewhat unique, not merely because it combines both particular knowledge and skills (many other specialties do this as well), but because the set of skills involved is for the most part not procedural, but rather cognitive. EM is quintessentially a diagnostic specialty, with undifferentiated disease presentation at its core, and the skills required of an EM specialist involve the ability to make crucial (sometimes even “life and death”) decisions in the face of a number of rather extraordinary stresses. An emergency physician not only has to establish priorities rapidly in any given patient, she has to do the same among a large group of patients. She doesn’t have the luxury of undertaking an orderly process comprised of history, then exam, then review of records, then labs or other work-up – as we were all taught in medical school – but often has to act entirely out of order, based on brief interactions and rapid assessment, without time to gather much of the information that could be helpful. And she’s got to do this with a patient she’s never met before, who is likely in pain, or anxious, or confused, or intoxicated, and so has no reason to trust her competence. Finally, these crucial decisions have to be made, and acted upon, quickly … knowing that other (potentially unstable) patients are waiting!

Learning to be an expert in Emergency Medicine is no easy trick, and – as with any specialty – it is best accomplished through a combination of training and experience. Residency training takes years, and achieving “mastery” of EM (to the extent that is ever truly possible) requires as well the ongoing experience that comes from caring for many patients; if my own learning trajectory is any indication, the end of residency is merely the beginning of one’s growth, and one continues to get better at this job for many years. *An Introduction to Clinical Emergency Medicine* is designed primarily for learners at or near the start of a career in EM, and is tailored to such learners in a developmentally appropriate way – because it stresses how to think as an emergency physician. Recognizing that the vast majority of our patients presenting with undifferentiated illness, this book is organized around an approach to symptoms (rather than diseases). The actual EM approach to diagnostic decision-making is far more complicated than the trendy “worst first” (rule out life threats) approach often cited; while we surely must keep this important consideration in mind, we also need to address a combination of disease likelihood, the potential to intervene in a way that matters, and an estimate of those circumstances in which delays in intervention would limit effectiveness. EM also emphasizes (in a way that is different from most other specialties, if not completely unique) the importance of treating acute symptoms (relieving suffering), in addition to the above concerns about identifying and addressing possible threats to life and limb.

While no book can replace the incremental learning obtained during a residency (and afterward), a good book can certainly help. Most books attempt to do so by trying to transmit knowledge; *An Introduction to Clinical Emergency Medicine* also tries to transmit cognitive skills, by focusing on the EM approach to evaluation. Like its first edition, this book is organized around specific complaints (symptoms), and stresses a standardized approach. This both makes for excellent readability, and keeps the focus on residents and senior students who are rapidly developing EM skills. This 2nd edition adds a critically important new element – the “red flag” approach that is the hallmark of how many expert EPs think about patients. For any and every patient presentation (“dizziness,” headache, low back pain, shortness of breath, etc.), there are a host of possible etiologies that range from trivial to life-threatening, and from likely to remote. As noted earlier, an organized approach in EM concentrates on identifying (or in many cases, excluding) those that not only have potentially important consequences, but are also reasonably probable for the given presentation, and are amenable to treatment that can actually limit adverse consequences, and require such treatment acutely if that benefit is to be achieved. Every EP should be able to call to mind the range of diagnoses that meet such criteria, for any given presentation. But that is not enough – because knowing why it is important to diagnose a sentinel subarachnoid bleed is not as much use unless one also knows under what circumstances it must be seriously
considered and investigated (as in a headache that starts suddenly and is maximal at onset), and just importantly when it shouldn’t be worked up (as in the average unilateral headache of gradual onset and progressive severity). An EP who orders an MRI for most patients with back pain will cause far more harm than good, but one who omits the MRI because he failed to ask about symptoms of cauda equina syndrome, or didn’t look at the needle tracks underneath a patient’s sleeve, is of course equally dangerous. An expert EP needs to consider PE in a patient who is suddenly short of breath in the setting of active cancer, but the EP who routinely orders a CT angiogram in patients with dyspnea is not an expert.

For every patient presentation, there are characteristics from the history and physical examination whose presence raises the likelihood of “do not miss” etiologies, and whose absence makes them much less likely. The expert EP will learn to organize his thinking not merely around such etiologies, but also around the findings that raise or lower the stakes. Most medical schools teach students to do a “complete” exam and take a “thorough” history. EM residencies, on the other hand, teach a “focused” work-up … but they also need to teach why one should ask a given question, because the answer (one way or the other) can and should decide your next step. Red flag questions are the most important ones we ask and this book can be an excellent tool to help learners understand when and why to ask them … and what to do with the answers.

Happy reading … and happy learning.

Jerome R. Hoffman, MA, MD
Professor of Emergency Medicine,
USC School of Medicine
Professor of Medicine Emeritus,
UCLA School of Medicine
Foreword to the 1st edition

Emergency Medicine represents the unique combination of rapid data gathering, simultaneous prioritization, and constant multi-tasking in a time-constrained fish bowl—with all decisions subject to second-guessing by others. It is a patient complaint-oriented specialty in which stabilization based on anticipation supersedes lengthy differentials and diagnostic precision.

In light of these unique aspects and attributes of clinical practice, one would expect the textbook-based literature supporting this specialty to be uniquely written and reflective of its singular approach. This has rarely been the case, a fact that has puzzled me for almost thirty years. It is true that sequential prose does not accurately represent the parallel processing necessary to practice effective and efficient Emergency Medicine. Still, it would seem the ideas of priority diagnoses, stabilization, initial assessment, prioritized differential diagnosis, and the rest that follows could be delineated and emphasized within the limitations of the printed word. I am pleased and delighted to find and convey to the reader that this text succeeds in translating this untraditional Emergency Medicine approach into a textbook format.

This text, edited by two academicians, S.V. Mahadevan, MD and Gus M. Garmel, MD from one of the nation’s premier academic institutions and leading health care organizations, fulfills what I have longed believed is the correct and necessary pathway to understanding the approach and thought processes that drive clinical decision-making in Emergency Medicine. The focus of the text is appropriately “presenting complaint-oriented,” with a thorough coverage of the chief complaints responsible for the majority of emergency department visits. Each chapter is structured in a consistent manner that allows the experienced and uninitiated alike to clearly track the thought process needed to bring one to a successful prioritized conclusion of care, even when a specific diagnosis has not been made.

The range of authorship is excellent, reflecting the talents and capabilities of an entire new generation of emergency physicians trained in the specialty. These authors clearly understand Emergency Medicine’s unique principles.

It is a rare gift to witness and participate in the passing of our unique specialties’ visions onto the capable hands of those you’ve had the opportunity to train and know. Because of this textbook’s organization and content, I am pleased to finally “rest in peace,” at least academically. Drs. Garmel and Mahadevan demonstrate their clear understanding and literary virtuosity in conveying the truth about our specialty to others.

It is my pleasure to congratulate them on a successful venture, to warn them that having started on this path serial additions and subsequent editions will rule their life for as long as they, the publisher, and the sales last, and to express a personal sense of satisfaction and pride in their accomplishment. To the reader, I say enjoy yourself. Take much away from this text and welcome the truth as we currently know it, presented in a manner that accurately reflects the way we practice.

Glenn C. Hamilton, MD, MSM
Professor and Chair
Department of Emergency Medicine
Wright State University School of Medicine
Editor, Emergency Medicine: An Approach to Clinical Problem-Solving
Acknowledgments

Drs. Mahadevan and Garmel would like to express appreciation to the American Medical Writers Association (AMWA) for selecting their 1st edition as First Place Winner, Medical Book Awards Competition (Physician Category) in 2006. Nicholas Dunton and his talented staff at Cambridge University Press deserve our gratitude for their continued belief in this ongoing educational project. We would like to acknowledge Rebecca Kerins (Baltimore, MD) and Ken Karpinski (Senior Project Manager, Aptara) for their outstanding production efforts. Steven N. Shpall, MD (The Permanente Medical Group, Mountain View, CA) contributed beautiful dermatologic photographs, and Chris Gralapp, MA, CMI (Medical and Scientific Illustration, Fairfax, CA) contributed phenomenal original artwork to both editions, making important clinical concepts easier to understand.

Drs. Mahadevan and Garmel are especially grateful to their contributors, national and international authorities in emergency medicine, who donated their expertise to this project for the greater good of patients and clinicians. Finally, special mention goes to Jerome Hoffman, MS, MD, who contributed the insightful foreword to this edition, and Glenn Hamilton, MD, MSM, who shared his views in our first edition – thank you both for your invaluable contributions to this enduring project, and for recognizing its importance.
Preface

Building on the strengths of its award-winning predecessor, the second edition of An Introduction to Clinical Emergency Medicine is a must-have resource for individuals training and practicing in this challenging field. This unique text addresses a wide range of clinical topics essential to the practice of emergency medicine. Guided by the patient's presenting complaint, this text emphasizes a methodical approach to patient evaluation, management and problem solving in the Emergency Department. Unlike other textbooks that elaborate on known diagnoses, this extraordinary book approaches clinical problems as clinicians approach patients – without full knowledge of the final diagnosis. This text effectively reveals how to address patients with undifferentiated conditions, ask the right questions, perform a directed physical examination, develop a logical differential diagnosis, and accurately order and interpret laboratory and radiologic tests. Current management and disposition strategies are presented, as well as a summary of pearls, pitfalls and myths for each topic.

Fully revised and updated – including current advanced life support guidelines – the second edition introduces important new chapters on sepsis, bleeding, burns, patient safety, alcohol-related and dental emergencies. The clinically-focused appendix includes new sections on clinical decision rules and focused emergency ultrasound, and improved sections on common emergency procedures and interpretation of emergency laboratory studies. Stunning full-color chapters include high quality images (photographs, ECGs and radiologic studies), detailed illustrations and practical tables. Each chapter in the second edition now contains a critical section on 'red flag' warning signs and symptoms, incorporating the heuristic approach used by successful emergency clinicians.

Written and edited by experienced educators, researchers and clinicians, An Introduction to Clinical Emergency Medicine, 2nd edition is certain to remain core reading for medical students and residents, and serve as an important resource for practicing emergency physicians, teaching faculty, and other healthcare providers.
Dedication

S.V. Mahadevan, MD, FACEP, FAAEM
To my parents, Sarojini and Mahadeva S. Venkatesan: For your incredible sense of duty and continuous sacrifices for the sake of your children and grandchildren.

To my mentors: For teaching me not to follow blindly but to question, investigate and discover. Your encouragement and guidance has shaped my career.

To my fellows, residents and students (at home and abroad): For continually inspiring me with your genuine desire to learn, innovative ideas, and unbridled enthusiasm. It is an honor and privilege to teach, advise, and befriend each one of you.

To Rema, Aditya and Lavanya: For encouraging me to seek out new challenges and fulfill my dreams. You fill me with strength, hope and happiness.

Gus M. Garmel, MD, FACEP, FAAEM
To my parents, siblings, extended family and friends: I am truly blessed by your continued support.

To The Permanente Medical Group, Kaiser Santa Clara Medical Center, Stanford University Division of EM, my talented colleagues in and outside of EM, our amazing nurses, and my patients: Thank you for offering me such wonderful opportunities and for enriching my life.

To the Stanford/Kaiser EM Residency Program, its current residents and alumni: I hope that I have served you well over the past 20 years as an educator, administrator, role model and mentor.

To students and housestaff everywhere: As the future of health care, I encourage you to approach patient care responsibilities and treat each patient with honor and privilege.

And to Laura, my partner and best friend: Through you, I’ve learned how to appreciate love more than I believed possible.