As societies become more complex and interconnected, the global risk of catastrophic disasters is increasing. Demand for expertise in mitigating the human suffering and damage these events cause is also high. A new field of disaster medicine is emerging, offering innovative approaches to optimize disaster management. Much of the information needed to create the foundation for this growing specialty is not objectively described or is scattered among multiple sources. Now, for the first time, a coherent and comprehensive collection of scientific observations and evidence-based recommendations from expert contributors from around the globe is available in Koenig and Schultz’s Disaster Medicine: Comprehensive Principles and Practices. This definitive work on disaster medicine identifies essential subject matter, clarifies nomenclature, and outlines necessary areas of proficiency for healthcare professionals managing mass casualty crises. It also describes in-depth strategies for the rapid diagnosis and treatment of victims suffering from blast injuries or exposure to chemical, biological, and radiological agents.

Dr. Kristi L. Koenig, Professor of Emergency Medicine and Director of Public Health Preparedness at the University of California, Irvine, is an internationally recognized expert in the fields of homeland security, disaster and emergency medicine, emergency management, and emergency medical services. During the U.S. terrorist attacks of 9/11, she served as National Director of the Emergency Management Office for the Federal Department of Veterans Affairs. With a strong health policy and academic background, including more than 80 peer-reviewed publications and more than 300 invited lectures in more than a dozen countries, she is widely sought for presentations at regional, national, and international forums.

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I dedicate this book to
The people of the world who have suffered from disasters
The frontline disaster workers
The visionaries who are crafting a new science of disaster medicine
My students, residents, fellows, and colleagues
My mother

Kristi L. Koenig, MD, FACEP

In appreciation and gratitude, I would like to acknowledge
The pioneers of our specialty who envisioned and helped create disaster medicine
Robert Bade, MD, and Robert Kingston, MD, who provided courage, guidance, and mentorship
My colleagues in disaster medicine who continue to pursue the dream
My children, Arielle and Eric, who motivate and inspire
My wife, Janet, whose love and incalculable support enabled me to complete this work

Carl H. Schultz, MD, FACEP
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Stan Natin, MB, BAO, BCh, LRCPI & SI, DCP, DCH, MICGP is a family practitioner in North Dublin who spent 3 years in surgical and emergency medicine. He has provided medical services at more than 200 events as part of the Mass Gathering Medical Care team. These range from small intimate concerts with attendances of approximately 5,000 to major rock festivals lasting 3 days with onsite camping for 60,000 people. Dr. Natin is part of one of the first groups of doctors in Ireland to complete major incident medical management training.

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Contributor Biographies

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Gilead Shenhar, MBA is a senior consultant on Homeland Security and is an expert in risk communication planning and solutions. Mr. Shenhar is an instructor and the academic coordinator at Tel Aviv University’s Executive Master’s Program for Emergency and Disaster Management. He is also an investigator at the Israel Center for Trauma and Emergency Medicine Research. He was previously the Head of Doctrine and Development for the Israeli Defense Forces Home Front Command and assisted with planning and executing risk communication for the civilian population.

Zane Sherif, MB, BAO, BCh, MSc was trained in general surgery and later specialized in orthopedic surgery. He developed an interest in management of acute trauma and subsequently became involved with the Mass Gathering Medicine Team in Ireland. Since returning to his native Australia, he has entered radiology residency with a view to becoming a specialist in musculoskeletal imaging.

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The concept of disaster medicine has been in evolution for decades. Its requisite components were buried within disparate, often apparently unrelated disciplines and specialties. Today, we know these diverse disciplines must work seamlessly together and are essential for disaster preparedness, response, mitigation, and recovery. Events such as the tsunami in Indonesia, Hurricane Katrina in the United States, the cyclone in Myanmar, and the Novel H1N1 (2009) pandemic have served to reinforce our interdependence on one another and the globalness of our interconnected responsibilities. As we view the challenge of “all-hazard” preparedness, we are forced to recognize that our geopolitical borders are meaningless and sometimes a barrier to the public’s health. In this new millennium, our nation and the globe must now reflect on contemporary threats that are truly international in scope, such as emerging infections, terrorism, weapons of mass destruction, and other disaster events.

From the late 1960s through today, I have had a unique vantage point to observe and contribute to our ever-expanding knowledge base in the fields of disaster and emergency management, as well as in public health and disaster medicine. As a medic, police first responder, registered nurse, physician, professor, trauma surgeon, and Surgeon General of the United States, I have been a witness and participant in this history.

As our knowledge base has exploded in depth and breadth, we have struggled with our own nomenclature and definition of terms. Such rapid growth has made achieving consensus on many complex issues extraordinarily difficult. Acknowledging the lack of international consensus on disaster nomenclature and other key issues, Koenig and Schultz have adopted a unique philosophical approach. They are moving the science of disaster medicine forward by describing its essential concepts and laying the academic foundation for this emerging specialty. Gathering experts from around the globe, the book reaches beyond state-of-the-art discussions to identify important areas that require immediate attention, hence laying the research agenda for the future. There is a focus on science and outcomes rather than opinions and anecdotes.

The “holy grail” of disaster management and care is the ability to surge as needed into a seamless, efficient, multiagency, and multidisciplinary force, united within an incident command system, addressing any and all hazards that may affect our communities, the nation, or the world. Although initial disaster response is local, disasters do not respect borders, and management approaches vary with available resources and existing infrastructures. The successful recruitment of disaster experts from around the globe to share knowledge from multiple perspectives is a key feature of this book.

Drs. Koenig and Schultz, as editors, have assembled a global force of experts to address the complex, interrelated topics and disciplines needed to create the end product that our nation and the world desperately need. The editors are well respected in the field of disaster medicine and have been promoting an academic approach to research and teaching since the very beginning of the specialty, long before it became popular after the tragic events of September 11.

With this publication, we are another increment closer to understanding the elements necessary to define our global interconnectedness during disasters.
Kristi L. Koenig

SETTING THE STAGE: A PERSONAL PERSPECTIVE

The specialty of disaster medicine has grown substantially since the terrorist attacks of 9/11 in the United States. In support of this growth, a number of disaster-related textbooks have been published. In some cases, however, these treatises have been authored by the 9/12’ers — people who suddenly gained interest and “expertise” in disasters once the topic became popular and U.S. federal funding flowed freely. As a result, much of the subject matter in these works was covered ineffectively. The challenge remained to create the definitive book written by nationally and internationally respected authors. We have considered editing such a book for the last dozen years; however, the timing never seemed right, and there was that ever-present thought that it would not be possible to “do it right” because we did not know exactly what “it” was.

Complicating the situation is the absence of a standard definition of disaster, much less a uniform concept for an academic discipline of disaster medicine. The need to codify this emerging discipline and create such standards is becoming increasingly clear. For example, the president of the United States issued a Homeland Security Presidential Directive (HSPD) on October 18, 2007 entitled “Public Health and Medical Preparedness.” HSPD-21 “establishes a National Strategy for Public Health and Medical Preparedness, which builds upon principles set forth in Biodefense for the 21st Century (April 2004).” It further emphasizes that “the Nation must collectively support and facilitate the establishment of a discipline of disaster health. The specialty of emergency medicine evolved as a result of the recognition of the special considerations in emergency patient care, and similarly the recognition of the unique principles in disaster-related public health and medicine merit the establishment of their own formal discipline. Such a discipline will provide a foundation for doctrine, education, training, and research and will integrate preparedness into the public health and medical communities.”

In an attempt to assist with the concept of disaster, one approach is to discard the term “disaster” — which is ill-defined — and replace it with the acronym PICE: potential injury/illness-creating event. PICE is a concise and precise phrase that immediately characterizes the incident and communicates the need for outside assistance. Although this method has not been validated or widely embraced, it has been described in major emergency

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Preface

Drafting a book about disaster medicine is a daunting task. The subject matter is vast, complex, and ever-evolving. This book is an attempt to capture the essence of disaster medicine, a field that is still in its infancy. It is a field that is shaped by the experiences of those who have lived through disasters, and it is a field that is driven by the need for innovation and adaptation.

Disaster medicine is a multidisciplinary field that encompasses a wide range of disciplines, including public health, emergency management, and medicine. It is a field that is characterized by its focus on preparedness, response, and recovery. It is a field that is characterized by its commitment to learning from past disasters to improve future ones.

As the world becomes increasingly interconnected, the frequency and severity of disasters are likely to increase. This book is an attempt to provide a comprehensive guide to the principles and practices of disaster medicine. It is an attempt to provide a framework for disaster medicine that is both practical and theoretical.

The book is divided into two parts. Part I provides an introduction to the field of disaster medicine, while Part II covers the specific issues and challenges associated with disasters. The book is intended for a broad audience, including students, practitioners, and policymakers.

We hope that this book will be a valuable resource for those interested in disaster medicine. It is our hope that it will help to advance the field and improve the outcomes of those affected by disasters.
The concept of “surge capacity.” Although “capability” refers to a fixed competence (e.g., the hospital has an angiography suite and is therefore “capable” of performing cardiac catheterizations), “capacity” implies a time-sensitive, current ability (e.g., at this very moment, there exists equipment, staff, and infrastructure such as electricity to operate the angiography suite). When something is preventing current capacity (i.e., lack of staff, supplies and equipment, a building, or organizational management structure), surge capacity is needed. This is a relatively new term that needs further definition and discussion. In addition, there is an urgent need to develop a “crisis standard of care” appropriate to the situation in which resources are insufficient at a certain point in time. Triggers to shift from standard operations to this crisis mode should be developed and key personnel must be educated in their use. We must also build resiliency into our emergency management systems.

**FORMAT OF THE BOOK**

This book is unique in many ways. We are taking a multidisciplinary approach and collaborating with well-respected academicians and researchers from around the world. In some cases, there is lack of agreement on how to describe or approach the challenges of disaster medicine. Rather than present only one view, we provide a balanced approach with the best science to support each perspective. Within this construct, to the extent possible, we present global (rather than U.S.-centric) perspectives and use a comprehensive emergency management, all-hazard approach philosophy to include a hazard vulnerability analysis. We do not include chapters about every conceivable type of event (e.g., stampedes, wildfires, civil unrest, and so forth); rather, there should be something unique about the topic for it to warrant a separate section. In addition, we emphasize the multidisciplinary nature of the emerging field of disaster medicine and draw heavily from the sociology literature (e.g., the concept of “disasters by design”) in addition to other relevant fields.

Chapters are divided into three sections: Overview, Current State of the Art, and Recommendations for Further Research. Hence, we not only provide current information but also look to the future and lay the research agenda for this emerging field, much of which could be considered “translational research” – an area receiving strong emphasis from the U.S. National Institutes of Health, or “transformational research” as promoted by the U.S. National Science Foundation.

**THE TIME IS RIGHT**

In 2006, the Disaster Medicine Certification Board was formed. Although visionary, it is perhaps premature to offer a certification in a field in which we have not yet proven a unique body of knowledge. To quote an esteemed colleague, “Our teaching must be based on knowledge, not on what we believe.” Too many times, in the early days of disaster medicine, presentations and publications dealt with personal observations and perceptions, and well-meaning presenters showed photographs of the most recent disaster response and told the audience what happened and what they did. Although a beginning, this is not true science. I am convinced that there is a unique body of knowledge that underlies the discipline of disaster medicine, but we do not yet have the data to support this belief.

Too often, a major disaster must occur before a responsible entity begins to provide sufficient resources toward improving medical and health outcomes. Disaster grant money frequently represents a government’s reaction to a devastating event and the need to “do something.” The interest of healthcare providers in preparing wanes as time passes after a catastrophic event. With global warming and the effects of climate change, we can only expect an increase in worldwide disasters. Developing a formalized academic specialty is an important step in providing resiliency with sustainable interest, funding, and readiness.

The time is now right, and Cambridge University Press is the right publisher to give the appropriate academic credibility to the project. In addition, I can think of no one more qualified and committed to join me as coeditor than Dr. Carl Schultz. Please enjoy this book and use it as a springboard to further academic discussion and debate as we move forward together to create and codify the rapidly emerging field of disaster medicine.
We gratefully acknowledge the staff and leadership of the American College of Emergency Physicians, especially Rick Murray, Marta Foster, and Tom Werlinich.

The American College of Emergency Physicians gratefully acknowledges two members who reviewed the content of this book on the College’s behalf:

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We are also grateful for the support of our publisher, Cambridge University Press and acknowledge the following individuals in particular: Marc Strauss, Monica Finley, Shelby Peak, Katherine Tengco, and Allan Ross.

In addition, we are indebted to our project manager at Aptara, Larry Fox.

Special thanks to Dean Ponbruk Sribanditmongkol, MD, PhD, at the Chiang Mai University in Thailand for the use of his tsunami photo on the book cover.

We also thank Professors Eric Noji, Francesco DellaCorte, and Marvin Birnbaum for their reviews and endorsements.