Evidence-based Emergency Medicine

This book is dedicated to:

Our patients, who have generated the clinical questions proposed in this book and who deserve our best efforts to identify, synthesize, update and disseminate evidence-based care;

The many practitioners from within and outside emergency medicine who have helped advance the field of evidence-based emergency medicine over the past two decades;

And finally to our families, especially our spouses/partners, for their support and encouragement throughout our careers and during the production of this book.

Evidence-based Emergency Medicine

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Foreword

Although the specialty of emergency medicine is only 40 years old, it has quickly matured into one of the most important arenas of practice in health care. In the United States, half of all hospital admissions and 11% of all outpatient health care encounters take place through emergency departments [1]. In Canada, which has placed a stronger emphasis on primary care, the percentages are smaller, but they are nonetheless substantial. Today, the term "ER" applies to more than a single room in the hospital, or even a popular television show. It is a comprehensive, multifaceted department that provides an astonishing array of advanced medical services, including rapid assessment and stabilization of patients with urgent or life-threatening conditions; medical direction of prehospital emergency medical services (EMS), cost-effective urgent care in specially designated "fast-track" areas, and detailed management of selected patients in emergency-department-based clinical decision units.

Practicing emergency medicine has always been challenging: patients arrive at all hours of the day and night; the range of problems emergency physicians encounter is incredibly broad; and the consequences of error are high. Undaunted, the doctors who established the specialty moved quickly to define its core competencies and teach them to a rapidly expanding circle of colleagues. They also worked diligently to secure recognition for their efforts in the House of Medicine. Almost as quickly, some of their number started figuring out how to make emergency care better.

Forty years later, the tens of millions of patients who annually seek care in hospital emergency departments and the tens of thousands of emergency physicians who treat them owe a debt of gratitude to the specialty's founders. Today, thousands of well-trained emergency physicians annually graduate from over 100 emergency medicine residency training programs in the United States and many more programs internationally. Across the developed world, modern emergency departments conduct comprehensive diagnostic evaluations and provide treatments that used to require a multiday stay in the hospital. In fact, emergency medicine has become such an integral component of modern health care that it is difficult to imagine how the system could function without it.

Concurrent with the growth and maturation of the specialty, emergency physicians have expanded their focus from providing life-saving care to whoever rolls through the door to medical direction of EMS and disaster medicine, education of medical students, residents and other health care professionals, performance of cutting-edge research, administrative leadership of emergency departments, hospitals and health systems, public health surveillance, *and* knowledge translation.

But all is not rosy. In some respects, emergency medicine has become a victim of its own success [2]. Over the past 15 years, society's growing reliance on emergency care has outstripped emergency medicine's capacity to meet this expanding need. In 2006, the Institute of Medicine (IOM) of the National Academies, a highly influential nongovernmental organization in the United States, issued three reports on the future of emergency care in the U.S. health system [3–5]. The picture it painted was troubling—despite dramatic improvements in emergency care, and the unquestioned dedication of those who provide it, the gap between public's need and system's capacity to meet it has grown so wide that hospital-based emergency care is (in the words of the IOM) at the "breaking point."

The IOM emergency care reports explicitly focused on the United States; however, many of its observations were equally germane to the emergency care systems of Canada, Australasia, Europe, and other parts of the developed world. Chief among these is the need to advance the quality, safety, and efficiency of emergency care through research, coupled with rapid translation of new knowledge to bedside care. The arguments for accelerating knowledge translation are compelling. The quickening pace of biomedical research and new developments in biomedical technology have dramatically expanded the diagnostic and treatment options available to emergency physicians. For example, advances in the detection of acute coronary syndrome and the discovery of thrombolytic therapy have given emergency physicians the ability to identify and abort many episodes of acute myocardial infarction before the condition causes death or irreversible harm. Moreover, other diseases that previously required many days of hospitalization (such as deep vein thrombosis, or DVT) can now

be diagnosed by emergency physicians and managed in the outpatient setting.

As history has taught us, not every newly developed treatment is a resounding success. Many turn out to be less beneficial than originally claimed. Some tests and treatments are so skillfully marketed that they work their way into standard practice despite inadequate evidence of their effectiveness or an imperfect understanding of their risks. Historic examples include incidents of torsade de pointes following more widespread use of ibutalide for atrial fibrillation and the development of renal failure in some patients receiving nesiritide for heart failure. To add to the modern clinician's dilemma, sometimes a long-established mainstay of emergency care is overturned by new evidence. No one can predict which test or treatment in routine use today will join Ewald tubes, corticosteroids for head trauma, intravenous aminophylline, and military antishock trousers in the dustbin of emergency medicine history.

If old (and time-tested) is not necessarily good, and new (and more expensive) is not necessarily better, where can a busy practitioner turn for guidance? The traditional strategy—asking a senior colleague for advice—does not work anymore. Management by anecdote/experience is unreliable (see "old and time-tested," above). Expert consensus, also known as the BOGGSAT* approach, is little better. It often recycles conventional wisdom or falls for the latest fad. Industry claims should always be viewed with skepticism, especially when accompanied by food or gifts. And the latest peer-reviewed study, even one published in a prestigious journal, may be overturned by subsequent research.

Evidence-based medicine (EBM) was created to meet the clinician's need for objective guidance in patient care. A simple term for a very complex task, EBM is a rigorous approach to finding and analyzing the best available evidence on any clinical question. Because EBM respects the principle of patient autonomy, it does not limit its recommendations to "the best" test or treatment; it presents acceptable alternatives. Moreover, a clinician's experience is also valued in EBM as part of the decision-making process. Championed by international groups such as The Cochrane Collaboration [6], the EBM movement has tackled a growing list of questions. Many of them are relevant to emergency medicine [7].

This book was conceived to place the power and intellectual integrity of the EBM approach into the hands of busy emergency care providers. The brainchild of a group of Canadian and U.S. academic emergency physicians, *Evidence-based Emergency Medicine* (EBEM) takes a different tack than that of traditional textbooks. Rather than providing a detailed review of the pathophysiology of every condition, *EBEM* is designed to answer the direct, give-me-the-bottom-line questions emergency physicians ask in the middle of their shifts—questions like "How useful is D-dimer for detecting DVT, a problem I can't afford to miss?" (answer in Chapter 12) and "What is the best intervention for treating acute migraine headache among the many available to me?" (answer in Chapter 48).

To assemble this compilation, EBEM's chief editor Brian Rowe and his fellow section editors Eddy Lang, Debra Houry, Michael Brown, Dave Newman, and Peter Wyer tapped many of emergency medicine's leading experts in EBM and the book's topics. The result is a practical guide to thoughtful practice, based on the highest level of evidence available. Does this book represent the "final word" on these conditions? Absolutely not. The editors will be the first to acknowledge this. It does represent, however, the best evidence *currently available* from the world's literature on these topics. As more research is published, some of the recommendations may change in future editions. Medicine is not static; it grows and evolves over time. The editors expect that their *EBEM* textbook will do the same.

Will you find answers to every important question in this book? Not yet. This is, after all, a first edition. As the IOM pointed out in its *Future of Emergency Care* series, there is a pressing need for more research in emergency care. If you scour the pages of this book and cannot find an answer for *your* question, do not feel frustrated or give up. Rather, I suggest you contact the editors and volunteer to submit an evidence synthesis for the second edition of *Evidence-Based Emergency Medicine.*

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* BOGGSAT = "Bunch of guys and gals sitting around a table."

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