

Contents

Foreword: Emergency Department Operations and Administration	xiii
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Amal Mattu

Preface: How the Emergency Department Works: A Work in Progress	xv
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Joshua W. Joseph and Benjamin A. White

Emergency Department Operations: An Overview	549
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Joshua W. Joseph and Benjamin A. White

Emergency department (ED) operations reflect the intersection of factors external and internal to the ED itself, with unique problems posed by community and academic environments. ED crowding is primarily caused by a lack of inpatient beds for patients admitted through the ED. Changes to front-end operations, such as point-of-care testing and putting physicians in triage, can yield benefits in throughput, but require individual cost analyses. Balancing physician workloads can lead to substantial improvements in throughput. Observation pathways can reduce crowding while maintaining safety. Physician and nurse well-being is an underappreciated topic within operations, and demands close attention and further research.

Queueing Theory and Modeling Emergency Department Resource Utilization	563
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Joshua W. Joseph

Queueing theory is a discipline of applied mathematics that studies the behavior of lines. Queueing theory has successfully modeled throughput in a variety of industries, including within the emergency department (ED). Queueing equations model the demand for different processes within the ED, and help to factor in effects of variability on delays and service times. Utilization is a measure of the throughput of a process relative to demand, and provides a quick means of comparing the demand for certain resources. Although there have been some significant successes in applying queueing theory to EDs, the field remains underused within ED operations.

Factors Affecting Emergency Department Crowding	573
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James F. Kenny, Betty C. Chang, and Keith C. Hemmert

Emergency department crowding is a multifactorial issue with causes intrinsic to the emergency department and to the health care system. Understanding that the causes of emergency department crowding span this continuum allows for a more accurate analysis of its effects and a more global consideration of potential solutions. Within the emergency department, boarding of inpatients is the most appreciable effect of hospital-wide crowding, and leads to further emergency department crowding. We explore the concept of emergency department crowding, and its causes, effects, and potential strategies to overcome this problem.

Staffing and Provider Productivity in the Emergency Department	589
Bryan A. Stenson, Jared S. Anderson, and Samuel R. Davis	
<p>Staffing and productivity are key concepts to understand when managing an emergency department. Provider productivity is not static, starts out high, and decreases throughout the shift in a stepwise manner. It is commonly measured by patients per hour or relative value units per hour, and is impacted by factors from the presence of residents to shift length. Appropriate staffing requires thorough understanding of the work-force and the variable patient demand of the department. Matching capacity to this demand potentially improves overall throughput and efficiency. Once knowledgeable about these factors, we provide a case study to showcase their application.</p>	
Patient Assignment Models in the Emergency Department	607
Nicole R. Hodgson and Stephen J. Traub	
<p>Early assignment of patients to specific treatment teams improves length of stay, rate of patients leaving without being seen, patient satisfaction, and resident education. Multiple variations of patient assignment systems exist, including provider-in-triage/team triage, fast-tracks/vertical pathways, and rotational patient assignment. The authors discuss the theory behind patient assignment systems and review potential benefits of specific models of patient assignment found in the current literature.</p>	
Design of the Academic Emergency Department	617
Kenneth D. Marshall, Bryan Imhoff, and Frank Zilm	
<p>This article introduces a clinical audience to the process of emergency department (ED) design, particularly relating to academic EDs. It explains some of the major terms, processes, and key decisions that clinical staff will experience as participants in the design process. Topics covered include an overview of the planning and design process, issues related to determining needed patient capacity, the impact of patient flow models on design, and a description of several common ED design types and their advantages and disadvantages.</p>	
Lean Process Improvement in the Emergency Department	633
Lorna M. Breen, Richard Trepp Jr., and Nicholas Gavin	
<p>Lean engineering is based on a process improvement strategy originally developed at Toyota and has been used in many different industries to maximize efficiency by minimizing waste. Lean improvement projects are frequently instituted in emergency departments in an effort to improve processes and thereby improve patient care. Such projects have been undertaken with success in many emergency departments in order to improve metrics such as door-to-provider time, left without being seen rate, and patient length of stay. By reducing waste in the system, Lean processes aim to maximize efficiency and minimize delay and redundancy to the extent possible.</p>	

Alternative Dispositions for Emergency Department Patients**647**

Alice Kidder Bukhman, Christopher W. Baugh, and Brian J. Yun

Alternatives to inpatient admission have been shown to be safe and effective for a variety of clinical conditions and can help relieve emergency department (ED) and inpatient crowding. Evidence-based alternatives include use of rapid ED follow-up clinics, observation units, and home hospital programs. Use of accelerated diagnostic pathways and shared decision making can help support clinicians and patients in appropriately choosing an alternative disposition to traditional inpatient admission. However, many institutions struggle to fully embrace possible alternative dispositions because of challenges of patient access, clinician and patient comfort with diagnostic uncertainty, and perceived medicolegal risks.

Quality Assurance in the Emergency Department**663**

William E. Baker and Joshua J. Solano

Quality assurance (QA) of care in the emergency department encompasses activities ensuring that the care provided meets applicable standards. Health care delivery is complex and many factors affect quality of care. Thus, quantification of health care quality is challenging, especially with regard to attribution of outcomes to various factors contributing to such care. A critical component of the process of QA is determination of quality health care and the concept of (unjustified) deviation from the reference applicable standard of care.

Information Management in the Emergency Department**681**

Evan L. Leventhal and Kraftin E. Schreyer

Information management in the emergency department (ED) is a challenge for all providers. The volume of information required to care for each patient and to keep the ED functioning is immense. It must be managed through varying means of communication and in connection with ED information systems. Management of information in the ED is imperfect; different modes and methods of identification, interpretation, action, and communication can be beneficial or harmful to providers, patients, and departmental flow. This article reviews the state of information management in the ED and proposes recommendations to improve the management of information in the future.

Best Practices in Patient Safety and Communication**693**

Dana Im and Emily Aaronson

Emergency medicine is a high-risk area of medical practice, with a high rate of preventable adverse events. This is multifactorial, hinging on the myriad system and processes issues that complicate emergency care. Strong teamwork and communication have been identified as critical components for safe care in emergency medicine. Health care professionals and leaders within emergency medicine can implement solutions aimed at cultivating a strong safety culture, creating processes and system-based approaches to improve patient safety. This article provides an overview of the evidence-based approaches to improve patient safety and communication.

Optimizing Patient Experience in the Emergency Department

705

Jonathan D. Sonis and Benjamin A. White

Emergency department (ED) patient experience is a growing area of focus for leaders in the ED and throughout health care. While many factors intrinsic to the ED care environment add to the challenge of providing patients with an excellent experience, doing so holds many benefits, including improved patient compliance and health outcomes, improved workplace satisfaction and reduced provider and staff burnout, decreased malpractice risk, and increased revenue. Although wait time is a major driver of patient experience, provider and staff communication are critically important and excellent communication and perceived empathy may mitigate long waits, overcrowded environments, and other challenges.

Management of the Academic Emergency Department

715

Deborah Vinton and Leon D. Sanchez

Academic emergency departments (EDs) play a vital role in provision of emergency care and contribute to training of resident physicians. Academic EDs also generate innovations and discoveries through clinical research within academic medical centers. However, academic EDs face challenges when initiating operational process improvement efforts because of the medical complexity of patients, academic culture within academic medical centers, and variability in productivity and specialty training of trainees. To optimize operations within academic EDs, it is critical to understand characteristics shared by academic EDs, how to implement process improvement initiatives, trainee impact on ED operations, and how to promote operational research.

Strategies for Provider Well-Being in the Emergency Department

729

Matthew L. Wong and Arlene S. Chung

A variety of operational and administrative factors have the potential to decrease wellness and negatively impact emergency physicians, in terms of both their on-the-job performance and their long-term career satisfaction. Among these are the issues of workload balance, physiologic and circadian stresses, and larger issues of malpractice risk and institutional support. This overview covers both emerging research on how these problems affect emergency physicians and strategies to help mitigate these challenges.