Comprehensive Healthcare Simulation
Series Editors: Adam I. Levine · Samuel DeMaria Jr.

Dimitrios Stefanidis
James R. Korndorffer Jr.
Robert Sweet *Editors*

Comprehensive Healthcare Simulation: Surgery and Surgical Subspecialties

Springer

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To our wives Evie, Melanie, and Ania for all their support throughout our careers and patience while editing this book.

Foreword

It has now been over 25 years ago since, as a young program director, I was approached by the Chief of Urology who complained that his residents were receiving poor basic surgical skills training during their general surgery internship under my direction. This encounter, along with other observations, convinced me that surgical training needed a fresh new approach to instruction in basic surgical skills. Few resources were available at that time to guide a young program director. Now 25 years later, a clerkship director, program director, or other leader in surgical education can find a wealth of outstanding information and guidance in this Surgery and Surgical Subspecialties Edition of *Comprehensive Healthcare Simulation*. The editors, Drs. Stefanidis, Korndorffer, and Sweet, are acknowledged leaders in the field of healthcare simulation and have accumulated a Who's Who list of authors that provide the best expertise available in their respective fields. This edition includes guidance for every step in the process of designing a new surgical skills program or reorganizing a long-standing program, including valuable information in the increasingly important area of simulation for nontechnical skills. Cross-fertilization and peer learning are certain to develop as a result of the comprehensive review of the current state of simulation for the subspecialties of surgery. This textbook should find a home in the library of every surgical educator.

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Preface

The application of simulation in surgery has seen tremendous growth in the past couple of decades. Our field has transitioned from the stage of justification for the use of simulation in surgery to broad implementation of simulators and skills curricula in many aspects of surgical training and education. Today, most educators and administrators recognize the value of using simulation-based curricula to prepare learners for the demanding environment of the clinic, wards, and operating room. Simulation-based training and assessment have become a part of our training culture. In addition, surgical applications of simulation have disseminated broadly across the surgical disciplines and levels of learners.

Still, several questions exist on how to optimally use simulation-based curricula to maximize the benefit to learners and the institutions they serve across the lifelong learning continuum that defines a surgical career.

We, therefore, present to you this book: *Comprehensive Healthcare Simulation: Surgery and Surgical Subspecialties.*

The book is part of *The Comprehensive Textbook of Healthcare Simulation* series and targets those who are involved in the training or assessment of surgeons and their teams using simulators and simulations. It aims to provide the reader with the best available evidence and methods for effective training and assessment using simulators in surgery. Our goal was to generate pragmatic chapters that will provide readers with information easy to adopt and replicate and/or tailor for their respective environment.

We are proud to present to you an international author list comprised of well-known experts and scholars offering their insight and guidance of best simulation practices in their discipline. Unique to this book is its focus on each surgical subspecialty where simulation is used.

Our book is comprised of five parts: Part I, Introduction to Surgical Simulation; Part II, Procedural Simulation; Part III, Simulation for Nontechnical Skills; Part IV, Subspecialties of Surgery: State of the Art; and Part V, Conclusion. In the first part, we start with a historical perspective (Chap. 1) and overview of simulation use in surgery (Chap. 2). We then propose a taxonomy for surgical simulation that aims to clarify some terms that cause confusion in the field (Chap. 3) and discuss principles of validity (Chap. 4). The latter chapter, written by one of the editors, provides the most up-to-date definitions around simulator validity and validation, a much needed reference for this often misunderstood concept in surgical simulation. Chapters 5 and 6 explore the necessary resources and funding models for effectively running your surgical simulation center.

Part II addresses important constructs around procedural simulation, the most common type of simulation used in surgery. The first chapter (Chap. 7) in this part addresses the role of simulation for outcome-based training exploring the concepts of competency/proficiency/mastery training. Best practices for skill maintenance, remediation, and reentry, performance assessment, and optimization are addressed in Chaps. 8, 9, and 10, respectively. This part concludes with the use of simulation for purposes of certification and high-stakes assessments (Chap. 11).

Part III addresses the application of simulation for nontechnical skills training in surgery. It provides best practices for debriefing (Chap. 12), team training in the operating room (Chap. 13), and applications of human factors in surgery (Chap. 14).

Part IV comprises the largest component of this book and addresses the use of simulation in multiple surgical subspecialties, including general surgery, laparoscopic surgery, robotic surgery, surgical endoscopy, surgical oncology and HPB surgery, bariatric surgery, critical care, cardiothoracic surgery, otolaryngology, urology, ophthalmology, vascular surgery, transplant surgery, plastic surgery, orthopedic surgery, and obstetrics and gynecology (Chaps. 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 30). These chapters present the state of the art of simulation in each subspecialty and provide best practices and future directions.

Finally, the last part that concludes this book is written by simulation visionary Dr. Richard Satava (Chap. 31) who provides the reader with his thoughts on the future of surgical simulation.

We believe that those who utilize and reference this book will obtain a great overview of how simulation is applied across surgical subspecialties and identify best practices in each discipline. Importantly, our hope is that this book will lead to cross-pollination of best practices among subspecialties, ultimately benefiting the learners and the patients they serve.

Indianapolis, IN, USA — Dimitrios Stefanidis
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