

# Improving Medical Outcome - Zero Tolerance



Anthony G. Gallagher • Gerald C. O'Sullivan

Petra Apell

Series Editor

# Fundamentals of Surgical Simulation

Principles and Practices

 Springer

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*The art of progress is to preserve order amid  
change and to preserve change amid order.*

—*Alfred North Whitehead*  
(15 February 1861–30 December 1947)



# Foreword and Introduction of Authors

From a health care administrative perspective, poor quality is primarily associated with higher cost. From a medical staff perspective, poor quality is a cause of disappointment and frustration for individuals and teams wanting to provide best possible care. For a patient, poor quality may result in a medical error drastically changing their quality of life.

With 20 years of experience in life sciences, primarily in medical skills training and business development, I have met powerful and insightful individuals with groundbreaking ideas whose research has contributed directly or indirectly to patient safety. What often strikes me, however, is that despite evidence of more people dying due to medical errors than from motor vehicle accidents, AIDS, and breast cancer; and despite recent improvement initiatives with proven clinical effect, such as the WHO Surgical Checklist, few practical solutions have been implemented and our society still puts very limited resources into issues concerning patient safety. To increase awareness and perhaps catalyze change, the book series “Improving Medical Outcome – Zero Tolerance” has been created. Each book will tackle a specific area of quality and patient safety; and leading experts will share their expertise and personal views on quality improvement strategies.

In this book, Prof. Anthony Gallagher and Prof. Gerald O’Sullivan have combined and integrated their unique perspectives on surgical training to produce a scholarly volume on training, learning, and practice of modern surgery. Prof. Gallagher is an experimental psychologist of international renown and a highly cited researcher in the field of human factors, objective assessment, and simulation. Prof. O’Sullivan is internationally renowned for his work as a practicing surgeon, cancer researcher, and professional leader within Irish, European, and World surgery. Using their expertise to analyze why modern image guided surgery is difficult to learn and practice, they have concluded that the difficulties faced are not just related to human factors, but arise from fundamental problems associated with a century old way of training in surgery. Gallagher and O’Sullivan propose the current Halstedian apprenticeship approach to training surgeons should be supplanted with a systematic, evidence-based, quality-assured approach based on simulation and not on clinical exposure and experience alone. They propose using a metric-based, deliberate practice curriculum requiring trainees to objectively demonstrate a pre-defined level of skills before being allowed to implement and consolidate their

skills in the clinical environment. The authors give a detailed account of the principles and practices of how this approach to training works, i.e., Proficiency Based Progression (PBP), including insights into a number of clinical trials utilizing this approach. Prospective, randomized, and blinded clinical trials have shown that proficiency-based progression trained surgeons perform significantly better than their traditionally trained counterparts.

The implications of this proficiency-based approach to the training of surgeons are profound. Appropriately trained surgeons and fellow medical staff team members can be expected to more reliably and uniformly provide the best possible care to patients. Improved care and less medical errors will lead to reduced costs. Most importantly, the ramifications of the proposed training approach will have a real impact on the quality of care and safety at individual level.

It is my wish that this book will become a true companion for individuals working with medical skills training and assessment. A companion, giving valuable advice or perhaps just make you think and act differently.

Petra Apell, M.Sc.

Disclosure: Mrs. Apell has held senior positions at Orzone AB, Mentice AB and Johnson & Johnson. Mrs. Apell is owner of Aproficio AB, holds shares in Orzone AB, and ensures she has not influenced the authors of this book to favor any of the companies in which she has financial interests.



# Preface

The spectacular developments in surgery and procedure based treatments brought to the agenda concerns about the training and development of skills by young doctors and the acquisition of modern techniques by experienced surgeons. There is a widespread recognition that the traditional system of skill development in the operating room is no longer adequate. Many of the operations that were commonly performed and were used in whole or in part for basic training experiences are no longer in common usage. Forty years ago a third-year general surgical resident could expect, each week, under supervision to perform or significantly participate in several open abdominal “set piece” operations such as vagotomy and drainage, open cholecystectomy, and hernia repair. The cure of ulcers by medical treatment replaced vagotomy and the widespread adoption of minimally invasive surgery for cholecystectomy and hernia repair removed large and important educational opportunities fundamental to the basic training programs of most of the surgical specialties. In addition, the introduction of working time directives and the requirement to train more surgeons without commensurate expansion of services restricted the clinical experience of the individual trainee.

The introduction of minimally invasive surgery, particularly laparoscopic cholecystectomy, was accompanied by an increased frequency of complications, many life-threatening, particularly during the early experiences. That these problems could occur when experienced surgeons, well versed in open procedures and with knowledge of anatomy and pitfalls embraced new procedural practices heightened concerns about the training of novices who lacked such a background in open surgery. But the agenda was now set, surgery needed to develop new methods for training the novice in surgical approaches in general and for training experienced surgeons in the newer techniques. A series of high profile adverse medical events drew the attention of the general public to issues of clinical training. The societal response was best epitomized by The Bristol Inquiry – “there can be no more learning curve on patients.” Surgery was forced to confront realities and to consider new approaches to surgical training – particularly the development and use of simulation to train and develop new techniques and procedures “off site.” Surgeon Trainers were forced to engage with psychologists and computer engineers to develop new simulation technologies and to validate simulation based transfer of training to the clinic and operating room.

In *Fundamentals of Surgical Simulation* we attempt to provide a resource for program directors, surgical trainers, surgical trainees, psychologists, simulation engineers, and researchers. For trainers, this book gives explicit theoretical and applied information on how this new training paradigm works thus allowing them to tailor the application of simulation training to their program, no matter where in the world they work. For the trainee, it allows them to see and understand the rules of this new training paradigm thus allowing them to optimize their approach to training and reaching proficiency in as efficient a manner as possible. For the simulation researcher, engineer, and medical profession *Fundamentals of Surgical Simulation* poses some difficult questions that require urgent unambiguous and agreed answers.

This book is the product of a friendship and mutual respect between an experimental psychologist and a practicing surgeon/surgeon trainer. This friendship permits forthright exchanges of views and endures many agreements and disagreements particularly on the science and philosophy of surgical simulation, training, assessment, and validation. The outcome has been consensus, fellowship, friendship, and an abundance of (Irish) *craic*.

AGG  
GCO'S

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Gerald C. O'Sullivan

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