Key Topics in Surgical Research and Methodology

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Foreword

This is the first book to distil the tried experiences and reflective thoughts of three world leaders in academic surgery to comprehensively present the essence of building a department of surgery of stature.

It is an ambitious undertaking. The contents cover all areas of activity that a modern and successful Professor of Surgery and Chief of Surgery of an academic department must be fully engaged in. These include traditional areas such as teaching, research, clinical service and administration. The demands for each of these areas have increased enormously in recent years. In addition however there are other important aspects particularly relevant to today's surgical practice such as healthcare delivery and leadership.

The vast amount of new knowledge currently available in these areas of responsibility, even for the most conscientious, is impossible to assimilate in a timely manner. This book covers all these and other subjects with sufficient information to very adequately arm the enquirer.

Bringing the many divergent threads that represent the required core skills and weaving them into a complex interlocking fabric has been excellently achieved. The chapters are contributed by world leaders, and embody the definitive current record. It is a text for anyone who aspires to pursue a career in academic surgery; in addition, it is also essential reading for those who wish to engage in the critical and rigorous intellectual exercises of the thoughtful surgeon.

In the Title and Preface the authors have placed emphasis on surgical research and its methods. This is to be interpreted in the broadest sense, as in many chapters of this book, there is a focus on the clinical care of patients. As such, it is also for those who wish to provide top quality service to their patients, whether in the university, teaching hospital environment or in the rural setting.

The authors combine the best of cross-Atlantic thoughts on developing a surgical department of excellence. It is not a cook book that will ensure success, but it will help to avoid much of the learning curve and help to minimise mistakes on the way. Consulting this work gives contextual background to aid in learning on the job and contributing to world-class research. It is an academic manual of the highest quality that communicates the most refined skills of leading academic units and surgeons.

The concept of this book is to go beyond the restrictive nature of traditional surgical texts, and prepares the future academic leaders in surgery. With the changing scenario in so many fields, it is predictable that a book such as this will need to be updated regularly.

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Preface

Academic surgery has gained considerable importance over the last century, and it continues to benefit from the significant advances in science and technology. Its role in the continually evolving world of modern healthcare is becoming increasingly influential. Many of the recent innovations in our surgical practice such as minimally invasive surgery, telerobotic surgery and metabolic surgery have been spearheaded by academic surgeons. This has only been possible through significant efforts in the implementation of cutting-edge research and the adoption of evidence-based practice. Much of this has been realised through judicious surgical leadership and academic departmental organisations who foster an environment where the best candidates can be selected. Individuals central to this approach are surgeons who are not only technically proficient but also academically productive.

Creating a dynamic exchange between research and clinical expertise has not always existed in the surgical profession. There are numerous operative practices that have few standards or have paradigms that are not wholly based on the best available science or evidence. The solution is self-explanatory and requires the adoption of educational excellence, technical proficiency and continual innovative research. Academic surgeons are key to implementing many of these strategic goals and will require an understating of many disciplines that range from basic laboratory research to statistical awareness of complex analytical methods. These proficiencies need to be accompanied by academic leadership, expertise in communication and non-technical skills.

The aim of this book is to equip surgeons across all disciplines and specialities to enhance their academic know-how in order to successfully work within a surgical academic unit and to maximise their academic potential. The goals are to endow the fundamental scientific tents of surgical science, and also to increase the awareness of the equally important areas of departmental collaboration, the adoption of business acumen, engineering knowledge and industrial know-how. It addresses a whole range of topics ranging from how to incorporate best surgical evidence, applying for grants, performing a research study, applying ethics to research, setting-up a surgical education programme and running an academic department. It also communicates many of the surgical technological highlights that are considered important in modern surgical practice and presents some of the most significant bimolecular concepts of the present and future.

Surgical research has improved in quality over the past few decades, and we present this book to advocate further the use of high-quality research in the form of clinical research trials. We strongly emphasise the importance of randomised studies with clearly defined, clinically relevant endpoints. Many of the chapters also focus on the increasing developments of biomedical technology in modern surgical practice.

They clarify the increasing need to understand and adopt these developments to augment surgical practice and patient outcomes.

The role of evidence-based surgery is also given particular focus. Although reading, interpreting and applying the best knowledge from the literature is one aspect of this field, it does not represent "all the evidence" available. This book considers a broader concept of evidence, and by doing so, specifies the central role of patients themselves within evidence-based practice. This is best understood through an equilibrium between the surgeon, the patient and the healthcare institution.

The concepts presented will require application within the context of healthcare organisations and institutions worldwide. Many of these are already large or are in the process of significant growth, requiring visionary leadership strategies. An example includes the Academic Health Science Centre model, where collaboration, research networking and global cooperation are imperative.

The scope of this book has been targeted to allow academic surgeons to exploit their local advantages whilst bridging the gap between surgical practice, patient safety and laboratory research. It will give an oversight of the importance of surgical research both locally and internationally. Many of the topics covered also highlight the importance of surgical research to governmental departments and policy makers. It will enable surgeons to clarify and prioritise the continuous influx of knowledge within the international literature. It strives to define the characteristics of talented individuals whilst also specifying the importance of market forces and administrative management. As such, we present it as a dedicated guide of modern academic surgery.

The future of the surgical profession lies in the development of our knowledge, treatment resources and our most prized asset, surgeons themselves. We cannot only enhance our current strengths, but we require the continual advancement of the next generation of our trainees. A roadmap for the development of our future surgeons can be achieved through academic curricula. We therefore envisage this book as a foundation guide for the training of academic surgeons.

This project would not have been possible without the significant knowledge forwarded by the chapter authors, many of whom are world leaders in their field. We thank our many colleagues and friends who helped us in this endeavour. The units where we work, namely the Department of Biosurgery and Surgical Technology at Imperial College London and the School of Medicine at the University of California, San Francisco, are sites of great inspiration and rewarding academic crosstalk that motivated us to write and prepare this book.

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His general research interests include quality metrics in healthcare and evidence synthesis including meta-analysis, decision and economic analysis. His statistical interests include longitudinal outcomes from cardiac surgical interventions. He has recently developed and published a novel methodology for analysing longitudinal and psychometric data.

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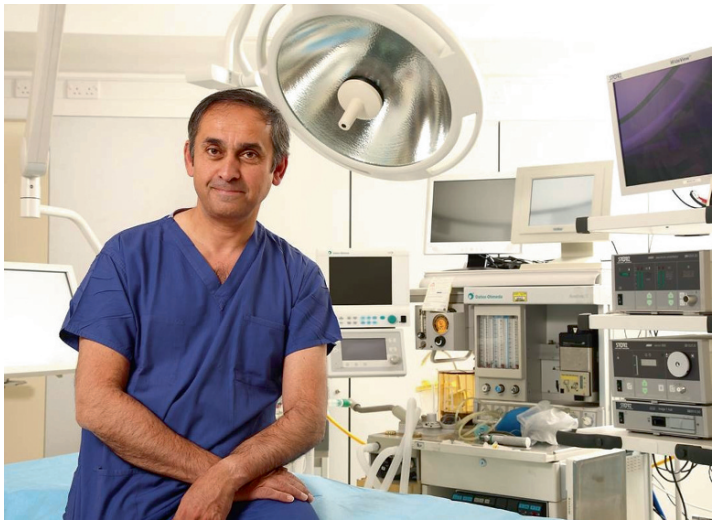
Haile T. Debas, MD, the Executive Director of UCSF Global Health Sciences, is recognized internationally for his contributions to academic medicine and is currently widely consulted on issues associated with global health. At UCSF, he served as Dean (Medicine), Vice Chancellor (Medical Affairs), and Chancellor. Dr. Debas is also the Maurice Galante Distinguished Professor of Surgery and chaired the UCSF Department of Surgery. A native of Eritrea, he received his MD from McGill University and completed his surgical training at the University of British Columbia. Under Dr. Debas's stewardship, the UCSF School of Medicine became a national model for medical education, an achievement for which he was recognized with the 2004 Abraham Flexner Award of the AAMC. His prescient grasp of the implications of fundamental changes in science led him to create several interdisciplinary research centres that have been instrumental in reorganising the scientific community at UCSF. He played a key role in developing UCSF's new campus at Mission Bay. He has held

leadership positions with numerous membership organisations and professional associations, including serving as President of the American Surgical Association and Chair of the Council of Deans of the AAMC. He served for two terms as a member of the Committee on Science, Engineering, and Public Policy of the National Academy of Sciences. He is a member of the Institute of Medicine and has served as Chair of the Membership Committee. He is a fellow of the American Academy of Arts and Sciences. He currently serves on the United Nations' Commission on HIV/AIDS and Governance in Africa, and is a member of the Board of Regents of the Uniformed Services University of the Health Sciences.



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Professor Lord Darzi holds the Paul Hamlyn Chair of Surgery at Imperial College London where he is Head of the Department of Biosurgery and Surgical Technology. He is an honorary consultant surgeon at Imperial College Hospital NHS Trust and the Royal Marsden Hospital. He also holds the Chair of Surgery at the Institute of Cancer Research.

Professor Lord Darzi and his team are internationally respected for their innovative work in the advancement of minimal invasive surgery, robotics and allied technologies. His research is directed towards achieving best surgical practice through both innovation in surgery and enhancing the safety and quality of healthcare. This includes the evaluation of new technologies, studies of the safety and quality of care, the development of methods for enhancing healthcare delivery and new approaches for education and training. His contribution within these research fields has been outstanding, publishing over 500 peer-reviewed research papers to date. In recognition of his outstanding achievements in research and development of surgical technologies,

Professor Lord Darzi was elected as an Honorary Fellow of the Royal Academy of Engineering, and a Fellow of the Academy of Medical Sciences.

Following a Knighthood in 2002 for his service to medicine and surgery, Professor Lord Darzi was introduced to the House of Lords in 2007 and appointed as Parliamentary Under Secretary of State at the Department of Health (2007–2009). At the Prime Minister's request, Professor Lord Darzi led a review of the United Kingdom's National Health Service, with the aim of achieving high quality care for all national healthcare patients.

He was awarded the Queen's approval of membership in Her Majesty's most honourable Privy Council in 2009. Professor Lord Darzi is currently appointed as the Global Ambassador for Health and Life Sciences, and Chair of NHS Global for the Cabinet office.

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The Role of Surgical Research

1

Omer Aziz and John G. Hunter

Contents

Abstract This chapter outlines the role of surgical research in advancing clinical knowledge, achieving better clinical outcomes and ultimately improving the quality of patient care. It reviews the origins of surgical research and the challenges that need to be overcome if it is to survive, describing the importance of translation of research into clinical practice through better trial design, information dissemination and teaching. Finally, this chapter looks to the future of academic surgery and the shape that this may take.

1.1 Introduction

Historically, research has played a crucial role in the advancement of medicine, our understanding of disease processes and the way that we study them. Clinicians and health care professionals across specialties and disciplines now use research in almost every aspect of their working lives in order to guide an evidence-based practice, evaluate the effectiveness of new therapies or demonstrate the efficacy of new health care technologies. The ultimate aim of clinical research is to improve the management that patients receive in order to achieve the best possible outcome for them. Financial support through government-funded grants, charities and the commercial sector has been a key driver for this and has led to the establishment of institutional clinical research units that employ academic clinicians across a range of disciplines. These academics are judged by both the quality and originality of the research their units produce, and are sustained by their fund-raising ability. While this has certainly raised the standard of research through improved trial design, execution and reporting, there remain areas within medicine where both the nature of the disease processes involved and the ethical dilemmas associated

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