Contents

An introduction to research, audit and teaching

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Every person who becomes a patient expects their consulting doctor to have an up-to-date working knowledge of the causes and treatment of disease in order to accurately diagnose and manage their care. All patients expect their doctor to be able to be able to weigh up the scientific evidence that is relevant to their particular condition or disease, and to recommend the best management strategy for them. In order for doctors to act in the patient's best interests, they need to be able to understand the research evidence available in their area of practice. All doctors should also be able to advise their patient on new areas of research which may be of relevance to their condition, and of active studies which may potentially question the effectiveness of current treatment strategies. Patients are also becoming a lot more knowledgeable and sophisticated and are able to appreciate that doctors who are involved in research have an aim to build on current clinical knowledge which may one day lead to improvements in the diagnosis, treatment and prevention of disease.

BOOK PURPOSE

This book aims to provide the knowledge and teach the skills to allow readers to provide high standards of patient care, achieving career success in the process. This involves having a clear understanding of essential scientific methods, principles and techniques. To achieve this, it is crucial that both undergraduate students and postgraduate doctors are equipped with the scientific skills to enable lifelong learning. The importance of acquiring these fundamental academic skills was highlighted in a report by Professor Sir Bruce Keogh. He found that hospital doctors who were more research-oriented and research-led were more likely to demonstrate high quality care. The following four sections of this book will provide you with the DNA to enable you to deliver safe and effective care to your patients:

- Research methodology
- Audit and its loop: the modern approach to improving healthcare practice
- Teaching theory and practice
- The essentials for career success

RESEARCH METHODOLOGY

Medical research encompasses 'basic science research' (also called bench science), which involves developing our understanding of more fundamental scientific principles, to clinical research, which is distinguished by the involvement of patients. The purpose of research is to discover better ways to treat and prevent disease and advance knowledge for the good of society. Undergraduate and postgraduate training are founded on established evidence through research and practice. The delivery of care to patients by healthcare professionals is based on decisions made from the best available evidence to inform diagnostic and management plans in order to meet patient needs. If there is limited evidence available in a particular area, it is the responsibility of the doctor to systematically search for it, evaluate it for scientific validity and determine whether it is applicable with respect to the decision required for the care of their patient. Every practising doctor should therefore maintain up-to-date knowledge relevant to their specialty and understand how to correctly evaluate and apply available evidence. This encompasses a key skill in being able to understand and critique statistical analyses. Overall, this forms a General Medical Council (GMC) Good Medical Practice principle, stating that doctors should 'provide effective treatments based on the best available evidence'. This principle should not be perceived as an option.

AUDIT AND ITS LOOP

Clinical audit, which is at the heart of clinical governance, involves reviewing the quality of current medical practice against explicit criteria for expected healthcare standards. Healthcare professionals should be actively involved in clinical governance to improve the quality of patient care. While clinical research aims to establish what is the best or most effective practice, clinical audit evaluates how closely local practice resembles this. Audit (and quality improvement) forms a key pillar of clinical governance, encouraging services to make better use of resources and therefore become more efficient. The data you gather during the audit process can be used to inform patients about the standard of care they are receiving. Audits may generate new research questions, which may subsequently be investigated using a

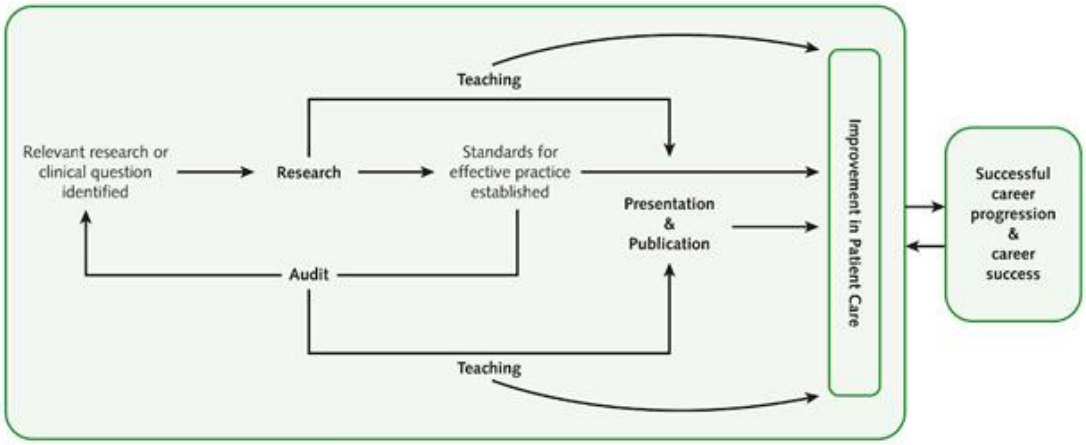

Fig. 1.1 The model for career success

research protocol. Audit and research may therefore follow each other in a continuous cycle. In an era where training doctors in management is often criticised, audits offer a good platform to learn about service provision and improvement.

TEACHING THEORY AND PRACTICE

The word 'doctor' means 'teacher' or 'learned one', and is derived from the Latin word *docere*, to teach. The GMC mandates that doctors have a professional obligation to contribute to the education and training of other doctors, medical students and nonmedical healthcare professionals on the team. Teaching activities allow you to consolidate and improve your knowledge in an area of interest, as well as improve your communication skills, which may translate to improved interactions with patients.

THE ESSENTIALS FOR CAREER SUCCESS

Fig. 1.1 illustrates how the different sections of this book are all linked together to form a model for career success. Recruitment panels recognize the importance of research, audit, teaching and publications, with a significant number of points awarded to these activities as part of your future job applications. The skills you will acquire by the end of this book will enable you to not only provide good medical care, as defined by the GMC, but also allow you to successfully advance on the career ladder in order to reach your potential. Good luck!

Chapter Summary

Clinical practice hones many skills that make doctors suited to research, such as teamwork, communication and analytical thinking. While not everyone should choose to pursue a long-term career in research, any time spent in research is valuable, as it will equip you with many different skills, including:

- Systematic reviewing and critical appraisal
- Numeracy (including an understanding of statistics)
- Evidence synthesis
- Communication (through teaching and publications)

FURTHER READING

British Medical Association (BMA), 2015. Every doctor a scientist and a scholar. Available from: https://www.bma.org.uk/advice/career/applying-for-a-job/every-doctor-a-scientist-and-a-scholar [Accessed 21st September 2018].

Evidence-based medicine 2

WHAT IS EVIDENCE-BASED MEDICINE?

Sackett and colleagues describe evidence-based medicine (a.k.a. 'evidence-based practice') as 'the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients'. Considering the vast rate at which medical knowledge is advancing, it is crucial for clinicians and researchers to make sense of the wealth of data (sometimes poor) that is available. Evidence-based medicine involves a number of key principles, which will be discussed in turn:

- Formulate a clinically relevant question
- Identify relevant evidence
- Systematically review and appraise the evidence identified
- Extract the most useful results and determine whether they are important in your clinical practice
- Synthesize evidence to draw conclusions
- Use the clinical research findings to generate guideline recommendations, which enable clinicians to deliver optimal clinical care to their patients
- Evaluate the implementation of evidence-based medicine

BOX 2.1 PICO MODEL

CLINICAL ENCOUNTER

John, 31 years old, was diagnosed with heart failure 3 years ago and prescribed a β-blocker which dramatically improved his symptoms. John's 5-year-old daughter, Sarah, has been recently diagnosed with chronic symptomatic congestive heart failure. John asks you, Sarah's paediatrician, whether his daughter should also be prescribed a β-blocker.

Is there a role for β-blockers in the management of heart failure in children?

Patient	Children with congestive heart failure
Intervention	Carvedilol
Comparison	No carvedilol
Outcome	Improvement of congestive heart failure symptoms

HINTS AND TIPS

Evidence-based practice is a systematic process primarily aimed at improving the care of patients.

FORMULATING CLINICAL QUESTIONS

The initial step in practising evidence-based medicine involves converting a clinical encounter into a clinical question. A useful approach to formatting a clinical (or research) question is using the Patient Intervention Comparison Outcome (PICO) framework. An example is provided in Box 2.1. The question is divided in to four key components:

- *Patient/Population*: Which patients or population group of patients are you interested in? Is it necessary to consider any subgroups?
- *Intervention*: Which intervention/treatment is being evaluated?
- *Comparison/Control*: What is/are the main alternative/s compared to the intervention?
- *Outcome*: What is the most important outcome for the patient? Outcomes can include short- or long-term measures, intervention complications, social functioning or quality of life, morbidity, mortality or costs.

Not all research questions ask whether an intervention is better than existing interventions or no treatment at all. From a clinical perspective, evidence-based medicine is relevant for three other key domains:

- *Aetiology*: Is exposure to a particular agent or environment a risk factor for developing a certain condition?
- *Diagnosis*: How good is the diagnostic test (history taking, physical examination, laboratory or pathological tests and imaging) in determining whether a patient has a particular condition? Questions are usually asked about the clinical value or the diagnostic accuracy of the test (discussed in Chapter 19).